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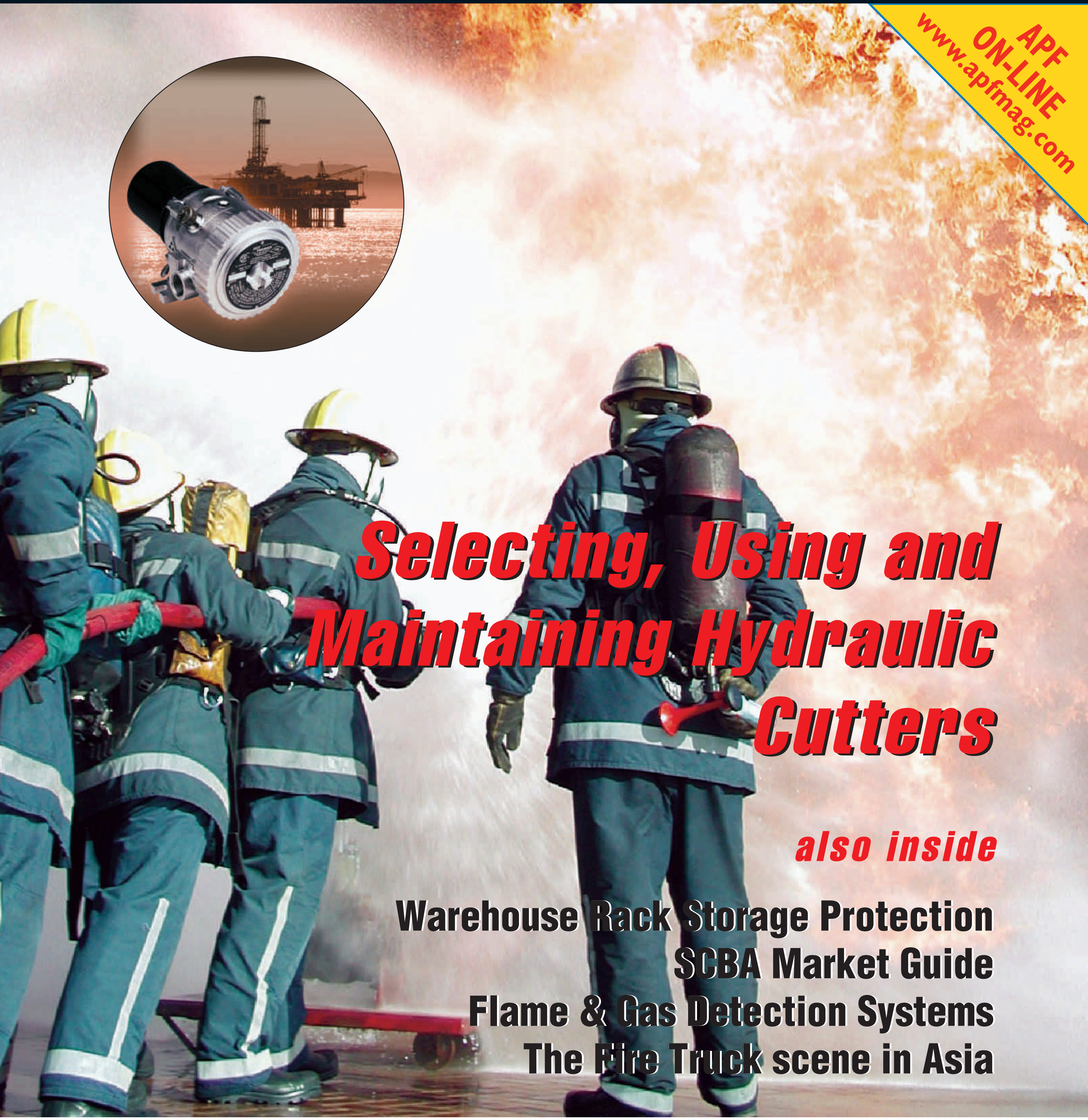
An MDM PUBLICATION
Issue 1 – March 2002

ASIA PACIFIC FIRE MAGAZINE



Selecting, Using and Maintaining Hydraulic Cutters

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Warehouse Rack Storage Protection
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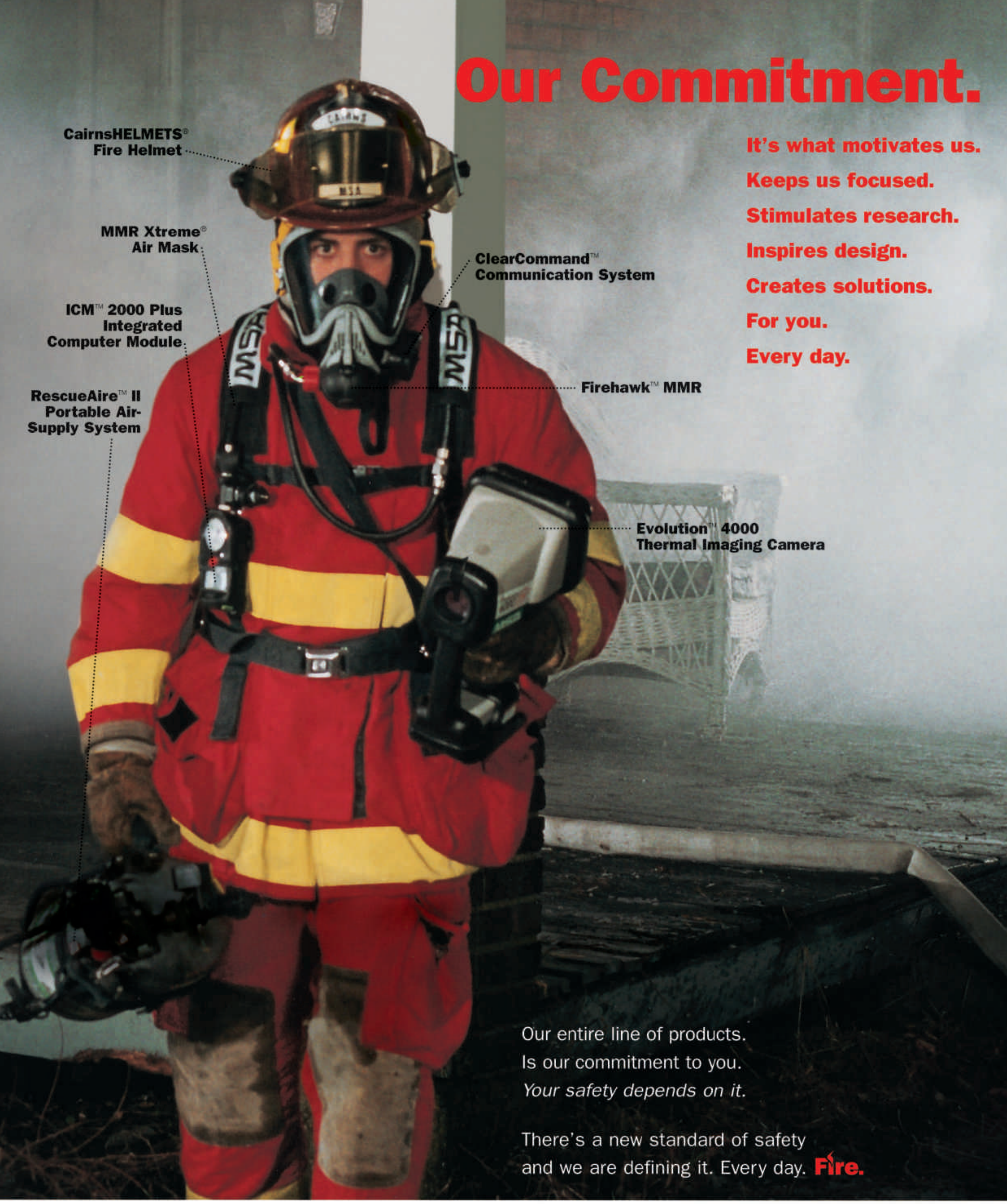
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FOREWORD

by Jeff Godfredson

NFPA's Asia-Pacific Operations Director

AS I TRAVEL THROUGH ASIA and read of tragic fires involving significant loss of life I am quite often asked what is the solution to these problems. Stating the solution is easy. First you need to select a good suite of Codes and Standards (Not surprisingly I would recommend NFPA's new full family of Codes which includes NFPA 5000; the new consensus building code.)

Next you need to ensure that the Codes and Standards chosen are adhered to during both design and construction. The following step on this path is to test and commission the inbuilt systems to ensure that they work as designed (i.e. sprinklers will flow the required water, smoke alarms will detect products of combustion in the required percentages, fire pumps will flow required amount of water for a given time, etc.)

When the building is occupied we need to ensure that the installed fire protection measures are not interfered with by occupation (no obstruction of sprinklers, no unsealed penetrations made to fire and smoke barriers, exits kept clear, etc).

The building owners should adopt a code of practice such as NFPA's Fire Prevention Code to minimize the likelihood of ignition and spread of fire. All of the installed systems need to be properly maintained for the life of the building.

It is sobering to put these steps down on paper and see that it is only a few paragraphs. We know these steps would produce a safe outcome as we have event after event where these simple steps are not followed and tragedies occur.

If it is so easy why isn't it done? There are many reasons.

The fire protection throughout the Asian region ranges from some of the best to include some of the worst. In some countries the pace of development has out paced the capacity of the infrastructure to keep up. The skill levels in some of the regulatory agencies has not kept pace with the technologies that enable them to build mega buildings. (I must say my comments are not limited to Asia. There are many so called developed countries were the level of fire protection/enforcement is not good.)

Finally, there is the issue of corruption. If it is possible to "buy" a certificate of occupancy in a poorly protected building or avoid the consequences of a locked or blocked stairway by paying a corrupt official these problems will never be solved.

The scale of these problems is daunting, but can be addressed if there is a will to improve fire safety. There is a need to draw a line in the sand and to stop allowing these problems to compound by pretending they do not exist. There is a need to provide additional skills to regulators and enforcers. A need to educate building owners that fire safety is smart business. A need to educate communities that fire safety is their concern and they have choices about where they spend their money and where they are entertained. It requires commitment by all parties but particularly community leaders and politicians.

If people want the fire problems solved they must be proactive, not reactive. It is much less costly in both monetary and human terms to deal with the issues before the fire.

Finally I would like to thank *APF* Magazine for the opportunity to share my views. I look forward to this partnership with *APF* and NFPA as a way of sharing solutions and experiences so that some people will be able to learn the lessons without having to wait for the experience to teach them.

Jeff Godfredson
NFPA's Asia-Pacific Operations Director

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Selecting, using and maintaining hydraulic cutters

WITHOUT A GOOD HYDRAULIC CUTTER, it is safe to say that a rescue organisation is not complete. The use of a hydraulic cutter is essential for so many rescue operations. In this article we will discuss some aspects of working with hydraulic cutters, such as the different cutter types that are available today, some practical tips on how to use cutters and how you should maintain your hydraulic cutter to ensure they provide many years of effective operation.

By Brendon Morris

Holmatro® Rescue Equipment's
Technical Rescue Instructor

DECIDING ON A CUTTER TYPE

The type of cutter your rescue organisation uses should suit the needs of the organisation. In order to ensure that you purchase the best suitable cutter it is a good idea to evaluate what type of cutting you will mostly be required to perform: Is your organisation mostly dealing with Road Traffic Accidents, with structural collapse accidents or with a mix of many application types. A good rescue tool range will provide you with a choice of hydraulic cutters, with varying blade designs, cutting forces and other design characteristics. Naturally weight of the tool, balance and ease of operation etc. should all be considered. Cutting force, blade design and safety aspects however need some closer attention.

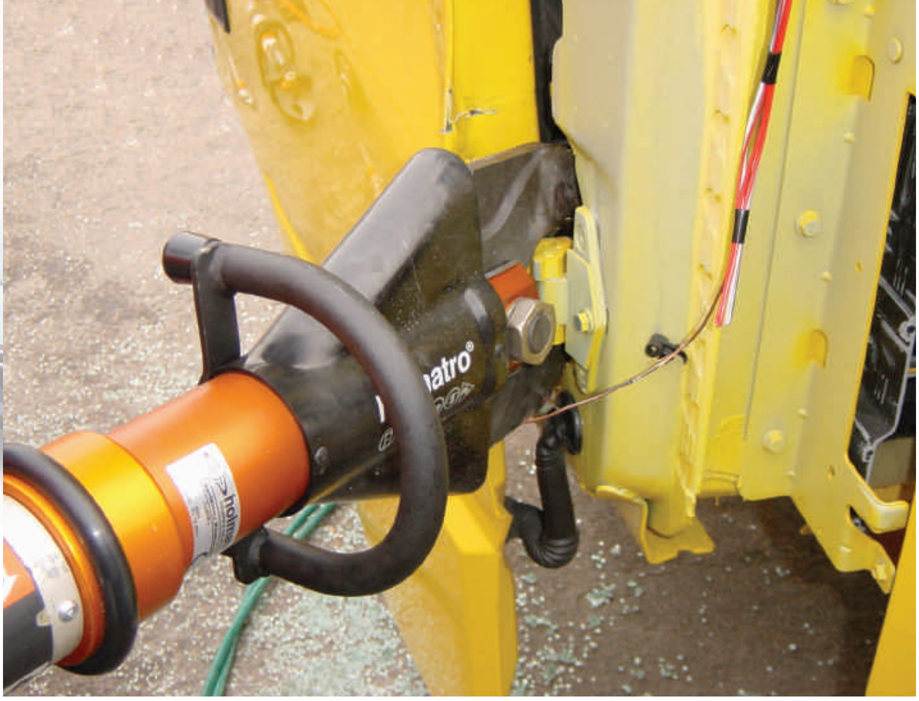
The amount of power you need from your cutter will of course have to balance with the size and weight of the tool. However, two power classifications that have been used in recent years are no longer considered very relevant. Cutting force in tonnes or kN says very little as it is a merely theoretical calculation. The percentage of the maximum cutting force that can actually be used in practice varies per cutter type and depends largely on the cutter's overall design characteristics. In recent years we have also seen that manufacturers advertised the thickness of round bar their cutter can cut. However, round bar is only one out of 5 material profiles stated in international norms such as prEN or NFPA. The prEN norm for example requires a cutter to cut each of 5 material profiles – round bar, flat bar, round tube, square tube and rectangular tube – 12 times each with one set of blades i.e. 60 cuts with one set of blades. Only after 60 cuts can a cutter meet the requirements of a certain cutting category of these norms. This means that 'Cutter X meets prEN norm cutting category H' tells you a lot. But 'Cutter X cuts 35 mm round bar' only has a meaning if the cutting category is stated as well.

One other aspect with regard to cutting capabilities that needs to be mentioned is that the 5 material profiles mentioned above give an indication of the cutter's versatility, i.e. suitability for a wide range of applications. However, if your rescue organisation mainly deals with road traffic accidents, a certain score on these material profiles says little about the suitability for cutting of material found in modern vehicles' A- and B-posts. The rapid developments in vehicle design have overtaken the more static norms. The near future is likely to see both specialised cutters that perform much better on modern vehicles and more versatile general-use cutters for general use applications. Specialised cutters for new very hard materials and constructions in modern vehicles of course still meet prEN or NFPA norm requirements but will not achieve as high a cutting score. More versatile cutters that score better on norm categories and are suitable for a wide range of applications perform significantly less on the materials and constructions used in the latest vehicles. Suitability

Selecting, using and maintaining hydraulic cutters

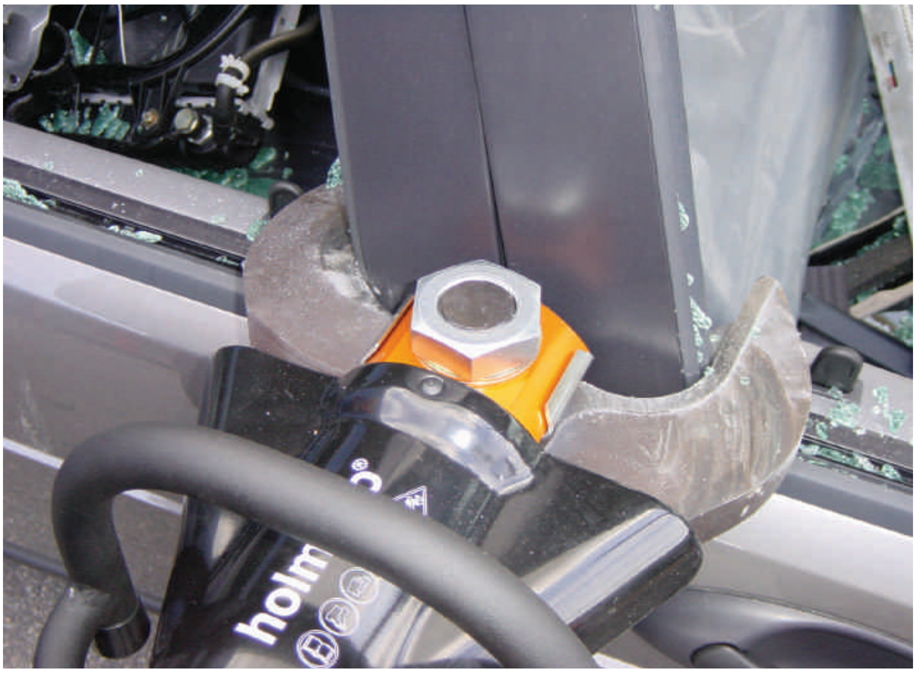
for a certain application is closely linked to a cutter's blade design.

Blades can normally be classified into one of the following five categories.



Cut under any right angle

- **Curved blade, without teeth ("parrot type" blade):** Material cannot be pushed forward, out of the blades, but is pulled to the recess. Very suitable to enclose and cut profiles like car posts or hinges.
- **Straight-toothed blade:** The teeth give the cutter an excellent grip on the material, but the risk of the material being pushed forward (out) is higher. The straight design is therefore less suitable to enclose and cut profiles but much better when cutting e.g. flat sheet metal.
- Parrot type tips, with a straight section including teeth near the recess: A blade type that combines the benefits of the parrot type blade and straight blade (but obviously is a compromise). The toothed part provides optimal grip and cutting performance, the curved part pulls the material in. Versatility is its main advantage. This is also normally the blade design that scores highest on rating systems such as those of the prEN and NFPA norms.
- **Mini-cutters with straight blades in a U-profile:** This allows for cutting in extremely confined spaces with relatively high forces (very high power-to-weight ratio). Other blade designs are often too big to cut e.g. steering wheels or foot pedals.
- **New Car Technology blades:** As discussed above the future will see specialised blades for incredibly strong constructions found in new vehicles, both cars and trucks.



Cut as close to recess as possible

USING YOUR CUTTER

Having discussed some of the aspects that need to be considered when deciding on a certain cutter type and brand, the next issue is what to pay attention to when using a tool to cut.

The angle at which you place your cutter will make a big difference in the way that your cutter performs and in the likelihood of damaging the tool or its blades. The golden rule here is to always be sure to cut at right angles to whatever you are cutting. By doing this you decrease the power needed to cut through the material as well as diminishing the chances of the cutter blades twisting as they move through the material. Over and above this, the use of this technique will put less strain on the cutting teeth on your blades (if that is the type of cutter you have).

The next thing to remember is always to use the area in the blade recess for cutting. This is where the tool generates its largest force and will make most effective use of the tool's power. This is normally achieved by positioning the tool with its recess as close to the cutting surface as possible. At the same time it is important to allow the cutter top move freely as it cuts, as it will normally chose the best path through

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the material. To try to steer or move the cutter during the cutting process will only cost you energy that is far better spent on something else.

The other thing to try to avoid is the accidental activation of the system when not required e.g. when putting the tool on the ground (stone). This can lead to dangerous situations. Accidental activation is almost impossible when using a turning deadman's handle system. In general it is a good idea to familiarise oneself with exactly which way causes the tool to open and which causes it to close. With a turning deadman's handle this is always the same, no matter whether the tool is above or below you. Of course this is not the case with a push button system as seen on some cutters.

Finally, the general handling of the tool is also very important. It is always a good idea to make use of a plastic sheet as a tool staging area as this will decrease the nasty scratches to the tools body and blade that comes from constantly placing it on tar and other rough surfaces. This may seem like a relatively unimportant thing to consider but the use of such a system also reduces the amount of kicking of the tool by mistake and standing on the hoses that occurs when tools are left around a rescue scene.

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MAINTAINING YOUR CUTTER

Like so many rescue tools, the more effort put into maintenance, the less chance there is of tool failure on the rescue scene, when you really need it. The other advantage of adopting a thorough maintenance program with your tools is the fact that you increase the life span of your rescue tools.

The first question is: "Who should carry out the repair and maintenance of your hydraulic cutter"? In order to ensure the safe and proper functioning of the tool it must be serviced by an accredited dealer or a technician who has received repair and maintenance training from the manufacturer or accredited dealer. This way you can ensure that the repairs will be carried out properly and that only the correct parts will be used. Of course good upkeep and routine checks of the tool must be the responsibility of the end user.

The best way to ensure proper maintenance of tools is to develop a checklist system for tool inspection: This checklist should include checks such as:

- Check of general condition of the cutter (clean/dry the tool)
- Light oiling of steel parts
- Check of couplers and dust caps for dirt and/or oil leakage
- Cleaning of couplers with a clean and soft cloth, if necessary with water and soap
- Greasing
- Check of the functioning of the deadman's handle (it must automatically return to its neutral position)
- Check of blades for straightness
- Check of the functioning of the equipment by opening & closing the cutter 2 times
- Check whether the blades move smoothly
- Check of connection hose(s) and mounting of the couplers

A checklist such as this should also have specific actions for certain findings. For example, if on examining the hoses of the tool one of the following is found, the cutter should immediately be taken out of active service for repair or replacement:

Cutting a C-Post off a modern vehicle

- Any steel covering of the hose is visible
- Blisters are visible
- Cuts are visible
- Obvious traces of kinks are visible.
- Protection springs are not mounted well

If such parameters are not set you will find that the checklist will prove to be futile in ensuring good maintenance of the tool. The above-mentioned examples of checks should take place at varying intervals, with routine services also taking place. Keeping track of the running total of the number of hours the tool has been in operation is the best parameter to use in deciding when the tool should be given a service. Your equipment supplier can give you detailed information about these aspects.

I certainly hope that this article has given you some ideas on how to get maximum satisfaction out of your hydraulic rescue cutter. Your equipment supplier is an important partner in the process of evaluating, using and maintaining hydraulic cutters. From rescue tool manufacturers themselves you should expect no less than that they stay ahead of the ongoing construction and design developments in the car industry and translate this into tools that are able to meet the challenges rescuers face in the field. Because one thing is for sure: of all the rescue tools a rescuer has at his disposal, the hydraulic cutter will always be one of the most vital pieces of equipment in ensuring a quick and smooth rescue operation.

Brendon Morris is Holmatro® Rescue Equipment's Technical Rescue Instructor. His responsibilities include training of Holmatro® users and Holmatro® dealers worldwide, as well as researching rescue disciplines to ensure that Holmatro keeps pace with latest rescue developments. Brendon Morris has an academic rescue background including extensive operational medical rescue experience.

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Wiring Fire Alarms for RELIABILITY

Picture courtesy of Notifier Ltd

By Dean K. Wilson, P.E., CFPS

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A fire alarm system may not work properly if the wiring isn't properly installed.

> "You can follow a careful design procedure. You can select a fire alarm system control unit, initiating devices and notification appliances from a quality manufacturer. But if you don't properly install the wiring that connects the system components together, the fire alarm system for your college campus or other protected property may not work reliably."

That was the response I got when I asked Richard Kleinman, president of AFA Protective Systems, Inc. in Syosset, New York, about the role wiring plays in overall fire alarm system reliability. His response nailed it.

As the least glamorous part of a fire alarm system, the wiring receives very little hype. Consumers may agonize over their choice of every other fire alarm system component, but very few shop carefully for the wiring that will connect those components.

Likewise, authorities having jurisdiction (AHJs), including the local fire marshal, fire prevention officer, or insurance inspector, will thoroughly check the placement and spacing of heat, smoke, and flame detectors; manual fire alarm boxes; and the horns, strobes, or other notification appliances. Only rarely will they pay much attention to the nature and character of the wiring.

BASIC PRINCIPLES

The 1999 edition of NFPA 70, National Electrical Code® (NEC®), contains requirements for properly wiring a fire alarm system. While these requirements may seem daunting at first, they become quite clear once a user understands certain basic principles.

The first major thing to realize is that NFPA 72, National Fire Alarm Code®, helps ensure fire alarm system performance. The second thing is that NEC requirements provide safety against electrocution from installed wiring and help prevent the wiring from starting a fire.

Before beginning any fire alarm system project, the building's owner must first determine the desired system performance by determining the installation requirements for the particular wiring method selected.

DETERMINING CIRCUIT PERFORMANCE

Once a building owner firmly establishes fire protection goals relating to life safety, property protection, mission continuity, heritage preservation, and environmental protection, he or she can develop the specific objectives for their fire alarm system. Then, the owner's design professional will draft a set of specifications for the system. Based on these specifications, the designer will select equipment from various manufacturers and develop a suitable design.

When the AHJs have approved this design, an installer will put the system in place. The AHJ will then witness initial acceptance tests. At this point, the building owner will begin to use the system and provide for periodic testing and maintenance.

As part of the specifications, the designer will determine the performance expected from the initiating device circuits, the signaling line circuits, and the notification appliance circuits.

The initiating device circuits connect the initiating devices to the fire alarm system control unit. Fire alarm initiating devices may include manual fire alarm boxes, heat detectors, smoke detectors, flame detectors, water flow alarm initiating devices, or extinguishing system-initiating devices. Supervisory initiating devices may include those for sprinkler system valve supervisory devices, air pressure supervisory devices, fire pump supervisory devices, water level or temperature supervisory devices, or building temperature supervisory devices, to name a few.

Signaling line circuits may include connections to digitally addressable fire alarm or supervisory initiating devices or connections between a protected premises fire alarm system control units and a proprietary supervising station. And finally, notification appliance circuits connect audible and visible notification appliances to the fire alarm system control unit.

For each of these types of circuits, NFPA 72 designates performance by both class and style. Class A circuits will be able to transmit a signal even with a single open fault or a single ground fault on the circuit, while Class B circuits will be unable

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to transmit a signal beyond a single open fault or ground fault.

NFPA 72 contains a table for each type of circuit that defines the performance of various circuit styles. Table 3-5 covers initiating device circuits, Table 3-6 covers signaling line circuits, and Table 3-7 covers notification appliance circuits.

To meet the requirements of Paragraph 3-4.3.2 of the code, the specifications for a fire alarm system should determine the appropriate circuit class and style based on a variety of factors, including the length of the circuit conductors; the total building area covered by, and the quantity of, initiating devices and notification appliances connected to a single circuit; and the effect of a fault in the fire alarm system on the objectives stated in Section 3-2. The nature of the hazard in the protected premises, the functional requirements of the system necessary to provide the level of protection required for the system, and the size and nature of the population of the protected premises must also be taken into account.

DETERMINE INSTALLATION

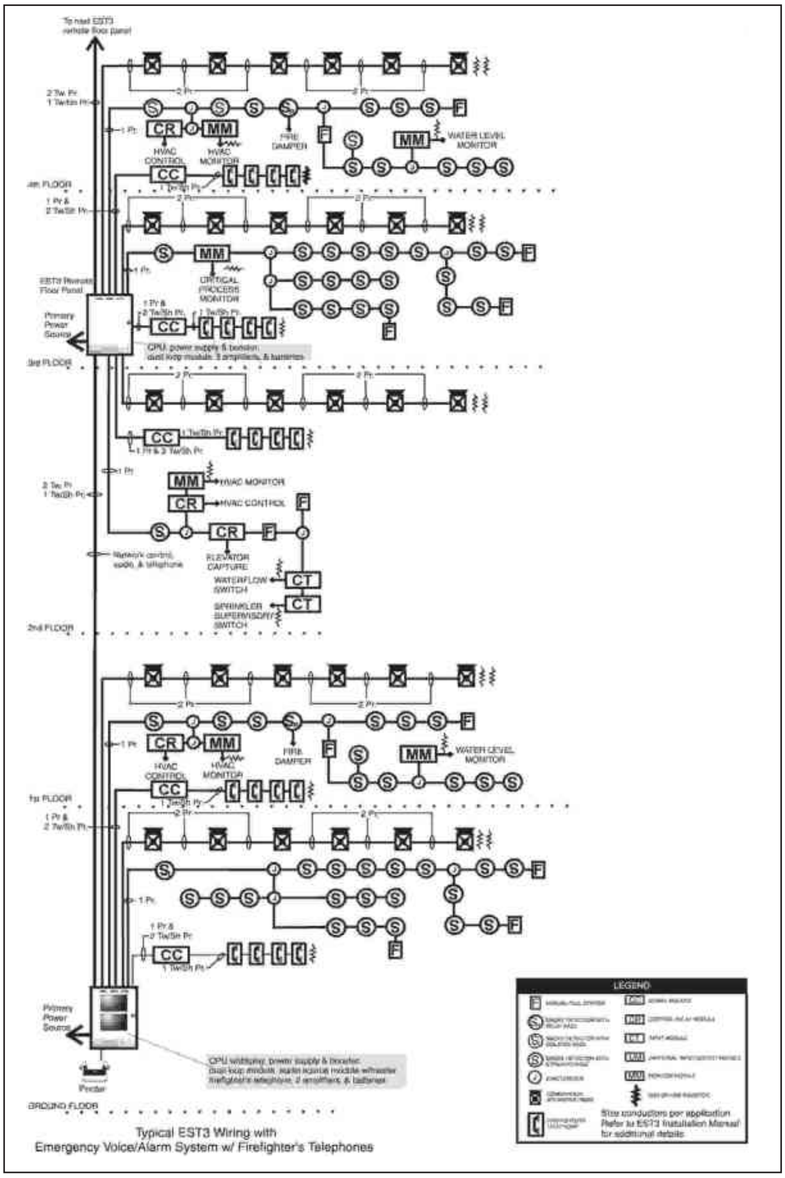
Paragraph 1-5.5.4 of NFPA 72 provides the baseline installation requirement, and its related Appendix item A-1-5.5.4 provides additional clarification. According to Paragraph 1-5.5.4, "the installation of all wiring, cable, and equipment shall be in accordance with the NEC, and specifically with Articles 760, 770, and 800, where applicable. Optical fibre cables shall be protected against mechanical injury in accordance with Article 760."

Appendix item A-1-5.5.4 states that "the installation of all fire alarm system wiring should take into account the fire alarm system manufacturer's published installation instructions and the limitations of the applicable product listings or approvals."

In addition, Paragraph 3-4.2.2.2 provides requirements for the installation of Class A circuits. With some exceptions, it requires the installer to route the outgoing and return conductors separately.

Paragraph 3-8.4.1.1 offers requirements for the survivability of wiring used for notification appliance circuits in fire alarm systems that provide partial selective evacuation or relocation of occupants to areas of refuge in the building during a fire emergency.

Paragraph 3-8.4.1.3.3.3 contains some specific requirements for a fire command center used in conjunction with an emergency voice alarm/communication system, stating that the specifications for a fire alarm system should prescribe the wiring method. The requirements of Article 760, "Fire Alarm Systems," in the NEC apply to all circuits powered by the fire alarm system control units. Control circuits connected to the fire alarm system control unit, but powered from some other source, such as an elevator control system, would have to meet the requirements of Article 725, "Class 1, Class 2, and Class 3 Remote-Control, Signaling, and Power-Limited Circuits."



To next EST3 remote floor panel
4th FLOOR
3rd FLOOR
2nd FLOOR
1st FLOOR
GROUND FLOOR
EST3 Remote Floor Panel
Primary Power Source
CPU, power supply & booster, dual loop module, 3 amplifiers, & batteries
CPU w/display, power supply & booster, dual loop module, audio source module w/master firefighter's telephone, 2 amplifiers & batteries
HVAC CONTROL
HVAC MONITOR
FIRE DAMPER
WATER LEVEL MONITOR
CRITICAL PROCESS MONITOR
ELEVATOR CAPTURE
WATERFLOW SWITCH
SPRINKLER SUPERVISORY SWITCH
Network control, audio, & telephone
Printer
CR
MM
CC
CT
LEGEND
Size conductors per application. Refer to EST3 Installation Manual for additional details
Typical EST3 Wiring with Emergency Voice/Alarm System w/ Firefighter's Telephones

Diagram courtesy of Edwards International

NEC, ARTICLE 760, PART A

Part A of Article 760 provides general wiring requirements and gives some key definitions for fire alarm circuit and fire alarm circuit integrity (CI) cable, as well as nonpower-limited fire alarm circuit (NPLFA) and power-limited fire alarm circuit (PLFA).

Section 760-3 also provides a reference to other NEC articles that specifically apply to the installation of fire alarm circuits, including installation practices relating to the spread of fire; ducts, plenums and other air-handling spaces; hazardous locations; corrosive, damp, or wet locations; building control circuits; and optical fiber cables.

Part A of Section 760-7 provides requirements for installing fire alarm circuits that must extend beyond one building and run outdoors. Such extensions of nonpower-limited fire alarm circuits must meet the requirements of Article 225, while such extensions of power-limited fire alarm circuits must meet the requirements of Article 800, Parts B, C, and D, or the requirements of Article 225.

Section 760-8 covers the requirements for the mechanical execution or work. Wiring must be installed in a neat and workmanlike manner. Cables must be supported by the building structure in such a way that normal building use won't damage the cable.

Section 760-10 requires that fire alarm circuits be identified at terminals and junctions to help prevent unintentional interference with these circuits during electrical maintenance.

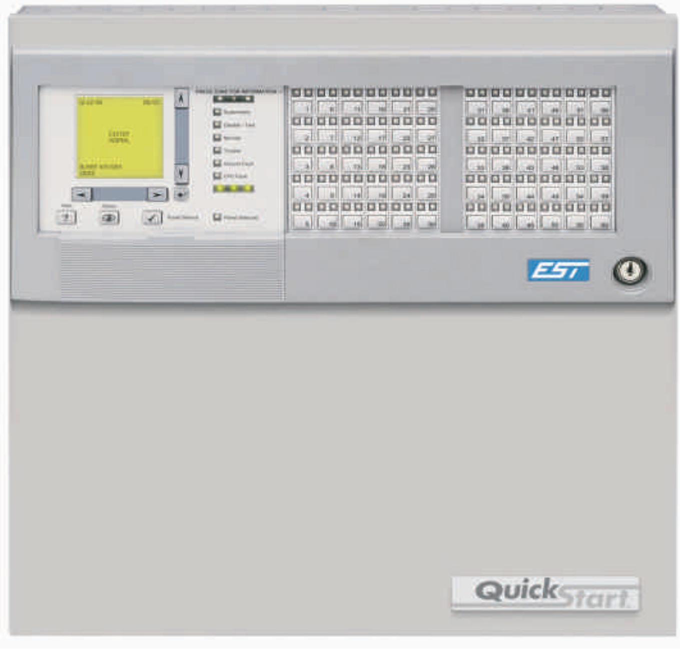
Section 760-15 offers two choices of fire alarm circuit types: nonpower-limited and power-limited. Unless a fire alarm circuit is designated as "power-limited," it defaults to the designation "nonpower-limited."

Fire alarm system control unit manufacturers use information contained in Tables 12(a) and 12(b) of Chapter 9 of the NEC to determine whether the design of the power supply for a particular circuit will allow that circuit to be designated as "power-limited." This means that the design professional writing the specifications for the fire alarm system must choose the wiring method based on the circuit designations of the specific fire alarm system control unit. Or, the design professional may choose to require that all circuits use nonpower-limited wiring methods.

NEC, ARTICLE 760, PART B

The principal differences between nonpower-limited fire alarm circuits and power-limited fire alarm circuits are the types of wiring methods that may be used with them and their requirements for intermixing with other types of circuits.

Part B of Article 760 covers the requirements for nonpower-limited fire alarm circuits. Section 760-25 requires that nonpower-limited fire alarm circuits use either the wiring methods found in Chapter 3 (Article 300) or listed multi-conductor nonpower-limited fire alarm cable. For most commercial or industrial installations, Chapter 3 wiring methods will require individual circuit conductors in raceway, and the installation methods described in Article 300 would apply.



Picture courtesy of Edwards International

Section 760-26 only allows nonpower-limited fire alarm circuits to be located with other circuits in the same cable, enclosure, or raceway. Nonpower-limited fire alarm circuits may be with Class 1 remote control circuits, but they may only be located with power supply circuits if they're connected to the same equipment.

Section 760-27(a) specifies the use of solid or stranded copper conductors of size 18 AWG or larger. If 18 AWG or 16 AWG conductors are used, the insulation on the conductors will be limited to the specific types in 760-27(b).

Section 760-28 limits the number of conductors and provides factors for conductors installed in cable trays and raceways, while Section 760-30 permits the use of listed multi-conductor nonpower-limited fire alarm cables. Cables listed for installation in other spaces used for environmental air receive the designation "NPLFP." Cables listed for installation in a vertical run in a shaft or from floor to floor are designated "NPLFR," and cables listed for general installation are designated "NPLF."

Section 760-30(a) allows these listed cables to be installed either on the ceiling or sidewalls in a raceway or exposed to be fished in concealed spaces. Cable splices or terminations must be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where they are exposed, they must be installed in such a way as to receive maximum protection against mechanical damage from the building construction. Cables within 7 feet (2 meters) of the floor must be securely fashioned in an approved manner at intervals of not more than 18 inches (46 centimeters).

Picture courtesy of Notifier Ltd

Section 760-30(b) requires that cables be installed in such metal raceway or rigid nonmetallic conduit where they pass through a floor or anywhere through a wall from the floor to a height of 7 feet (2 meters) unless adequate protection can be provided by building construction or by a solid guard.

Section 760-30(c) requires the use of a rigid metal conduit, a rigid nonmetallic conduit, an intermediate metal conduit, or electrical metallic tubing where such cables are installed in hoistways. An exception permits methods used for elevators as specified in Section 620-21.

A nonpower-limited fire alarm cable may be marked for circuit integrity if it passes appropriate tests. Such cables may then be used to meet the requirements of NFPA 72, Paragraphs 3-4.2.2.2, Exception (b), and 3-8.4.1.1.4 (1).

NFPA 70-1999, ARTICLE 760, PART C

Part C of Article 760 covers the requirements for power-limited fire alarm circuits. Section 760-42 requires that all power-limited circuits be durably marked in a place that is plainly visible, so manufacturers usually mark the terminals on the fire alarm system control unit or the accompanying wiring diagram. Circuits that don't have such a marking are considered nonpower-limited.

Section 760-52 specifies the use of solid or stranded copper conductors, while Section 760-52(a) permits power-limited fire alarm circuits to use nonpower-limited fire alarm circuit wiring methods or listed multi-conductor power-limited fire alarm cables. If a power-limited circuit is reclassified and installed as a nonpower-limited circuit, Section 760-52(a), Exception No. 3, requires that the power-limited marking be removed. Sections 760-52(b)(1) and 760-52(b)(2) go on to mirror the requirements of Sections 760-30(a) and 760-30(b) for nonpower-limited fire alarm circuits.

Like Section 760-30(c) above, Section 760-52(b)(3) requires the use of a rigid metal conduit, a rigid nonmetallic conduit, an intermediate metal conduit, or electrical metallic tubing where such cables are installed in hoistways. Again, there's an exception for elevators, as specified in Section 620-21. For power-limited fire alarm circuits, however, there's another exception, which permits other wiring methods and materials installed in accordance with the requirements of Section 760-3 to extend or replace these conductors and cables.

The location of power-limited fire alarm circuits with other circuits in the same cable, enclosure, or raceway is limited by Section 760-54(a). Power-limited fire alarm circuits may not be located with electric light circuits, power circuits, Class 1 remote control circuits, nonpower-limited fire alarm circuits, or medium-power network-powered broadband communications circuits, although exceptions permit the use of a barrier to separate these types of circuits. Where different types of circuits must connect to the same equipment, physical separation must be maintained, or the power-limited fire alarm circuit conductors must be equipped with nonconductive sleeving.

Section 760-54(b) allows power-limited fire alarm cables to be installed with Class 3 circuits and with low-power network-powered broadband communications cables. Power-limited fire alarm cables may also be located with Class 2 circuits if the Class 2 circuit has an insulation at least equal to the insulation on the power-limited fire alarm circuit.

Section 760-54(c) forbids power-limited fire alarm circuit conductors to be strapped, taped, or attached by any means to the exterior of any conduit or other raceway as a means of support.

Section 760-61 specifies the use of listed multi-conductor power-limited fire alarm cables. Cables listed for installation in ducts, plenums, and other spaces used for environmental air are designated "FPLP," while those listed for installation in a vertical run in a shaft or from floor to floor are designated "FPLR," and those listed for general installation use are designated "FPL."

Section 760-61(d) permits the substitution of certain listed cables for listed power-limited fire alarm cables, and Section 760-71(g) permits a power-limited fire alarm cable to be marked for circuit integrity if it has passed appropriate tests. Such cables may be used to meet the requirements of NFPA 72, Paragraphs 3-4.2.2.2, Exception (b), and 3-8.4.1.1.4 (1).

SUMMARY

Fire alarm system wiring can significantly influence the overall reliability of any fire alarm system, so it's incumbent on design professionals to specify the appropriate wiring methods carefully. The requirements of both the NEC and NFPA 72 provide specific guidance that can help the system designer, installer, authority having jurisdiction, and user make certain that the fire alarm system's wiring will allow it to operate properly when a fire occurs.

Dean K. Wilson, a licensed professional fire protection engineer and certified fire protection specialist with an office in Windsor, Conn., is a senior engineer with Hughes Associates, Inc. An NFPA member, he is member emeritus of the Technical Correlating Committee of the National Fire Alarm Code and past chair of Code Making Panel 16 of the National Electrical Code.

Consumers may agonize over their choice of every other fire alarm system component, but very few shop carefully for the wiring that will connect those components.

The 1999 edition of NFPA 70, National Electrical Code®, contains requirements for properly wiring a fire alarm system.

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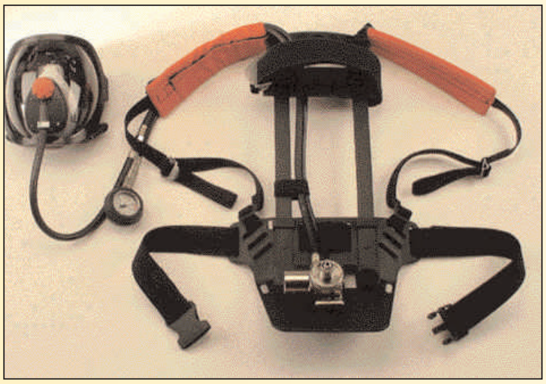
MARKET GUIDE

Self Contained Breathing Apparatus (SCBA)



SCBA sets are used across a great many of the rescue services. At the forefront are the Fire Services, both civil and military. On top of this, teams from the Mines Rescue, Industrial Plants, Special Casualty Access Teams and Maritime Fire Services all make use of such equipment.

Due to the vast number of sets available in today's market, this guide refers only to back-mounted, longer duration compressed air breathing apparatus. We haven't included Rebreathers, Escape Sets, dedicated Airline or waist-mounted sets. ***APF*** will be looking at these later in the year.

So, here we have what is probably one of the most comprehensive guides to the SCBA sets available today. No doubt most of you will be familiar with the company names represented here. We have asked as many pertinent questions as possible without trying to become over technical. Also, this guide is not a comparison and as such we have not gone into the advantages and disadvantages of each particular set.

Please don't let the country of origin put you off – all of the manufacturers here have dealers and distributors in the Asia Pacific region, so simply get in touch and they will put you in contact with your local supplier.

The next instalment of this guide will be looking at Escape Sets in the September 2002 issue of ***APF*** Magazine.

	AIRMASTER TECHNOLOGY LIMITED				DRAEGER			
SET	**Eclipse (Eclipse XL)**	**SG-100**	**SG-200**	**SG-220**	**Draeger PA91 Plus**	**Draegerman PSS 90**	**Draegerman PSS 100**	**Draegerman PSS 500**
ORIGIN	UK	UK	UK	UK	UK	UK	UK	UK
WEIGHT EXC. CYLINDER	3.5KG	3.1KG	3.2KG	3.5KG	3KG	3.2KG	3.3KG	5.8KG
DURATION (SINGLE)	30-60 Mins	30-60 Mins	30-60 Mins	30-60 Mins	30, 45 & 60 mins	30, 45 & 60 mins	30, 45 & 60 mins	40 mins
TWINNING	Option	Option	Option	Option	No (Twinpack kit upgrade available)	Yes	Yes	No
PRESSURE	200 / 300 bar	200 / 300 bar	200 / 300 bar	200 / 300 bar	200 / 300 bar	200 / 300 bar	200 / 300 bar	300 bar
CONTENTS GAUGE	Luminous Analogue	Luminous Analogue	Luminous Analogue	Luminous Analogue	Luminescent Analogue Gauge with Integrated Warning Whistle	Analogue Gauge or Bodyguard II Electronic Monitoring Unit	Analogue Gauge or Bodyguard II Electronic Monitoring Unit	Analogue Gauge or Bodyguard II Electronic Monitoring Unit
DEMAND VALVE	Front Mounted with Bypass	Instant Positive Pressure or AirSwitch R Activation	Instant Positive Pressure or AirSwitch R Activation	Instant Positive Pressure or AirSwitch R Activation	Streamlines "Plus" Lung DV with Wraparound Silicone Cover	Streamlines "Plus" Lung DV with Wraparound Silicone Cover	Streamlines "Plus" Lung DV with Wraparound Silicone Cover	Streamlines "Plus" Lung DV with Wraparound Silicone Cover
DV ACTION	Fresh Breath	Push Button On/Off or Instant Positive Pressure	Push Button On/Off or Instant Positive Pressure	Push Button On/Off or Instant Positive Pressure	First Breath Instant Positive Pressure	First Breath Instant Positive Pressure	First Breath Instant Positive Pressure	First Breath Instant Positive Pressure
DV RESET	Pull Bypass Knob Out	Press Slide Up or Auto P/P	Press Slide Up or Auto P/P	Press Slide Up or Auto P/P	Button located on top of DV	Button located on top of DV	Button located on top of DV	Button located on top of DV
BUDDY DV	No (Option XL)	Option	Option	Option	Option	Option	Option	Option
FRESH AIR	Remove DV	Option	Option	Option	No	No	No	No
ALARM	Cylinder Air Whistle	Cylinder Air Whistle & Mask LED	Cylinder Air Whistle	Cylinder Air Whistle	Low Pressure Warning Whistle	Low Pressure Warning Whistle or Bodyguard II Electronic Monitoring Device	Low Pressure Warning Whistle or Bodyguard II Electronic Monitoring Device	Low Pressure Warning Whistle or Bodyguard II Electronic Monitoring Device
SPEECH AMPLIFIER	NO	Option	Option	Option	Yes	Yes	Yes	Yes
AIRLINE / DECON	No (Option XL)	Option	Option	Option	Option	Option	Option	Option
BACKPLATE	Nylon	Nylon	Nylon	Nylon	Antistatic Composite Material	Antistatic Composite Material	Antistatic Composite Material with Height adjustment and swivelling waistbelt	Antistatic Composite Material with Height adjustment and swivelling waistbelt
PADDED WAIST BELT	Eclipse (Eclipse XL)	No	No	Yes	No	Yes	Yes	Yes
PADDED SHOULDER STRAP	No (Yes XL)	Yes	Yes	Yes	No	Yes	Yes	Yes
MASK OPTIONS	Silicone (3 Sizes)	Silicone (3 Sizes) Double Curved Lens	Silicone (3 Sizes) Double Curved Lens	Silicone (3 Sizes) Double Curved Lens	Panorama Nova or F2. Available in EPDM & Silicone	Panorama Nova or F2. Available in EPDM & Silicone	Panorama Nova or F2. Available in EPDM & Silicone	Panorama Nova or F2. Available in EPDM & Silicone
MASK SPIDER	5PT Silicone	Single Pull Net Harness	Single Pull Net Harness	Single Pull Net Harness	5pt Fully Adjustable Head Harness	5pt Fully Adjustable Head Harness	5pt Fully Adjustable Head Harness	5pt Fully Adjustable Head Harness
ACCESSORIES	No	Option	Option	Option	Mask Storage Bag Cylinder Cover Wall Cabinet Portable Carry Case Comms System Automatic Distress Signal Unit Cleaning & Testings Accessories	Mask Storage Bag Cylinder Cover Wall Cabinet Portable Carry Case Comms System ChargAir (Quick Fill Device) Bodyguard II Electronic Monitoring Device PSS Merlin Telemetry System Cleaning & Testings Accessories	Mask Storage Bag Cylinder Cover Wall Cabinet Portable Carry Case Comms System ChargAir (Quick Fill Device) Bodyguard II Electronic Monitoring Device PSS Merlin Telemetry System Cleaning & Testings Accessories	Mask Storage Bag ChargAir (Quick Fill Device) Bodyguard II Electronic Monitoring Device PSS Merlin Telemetry System Cleaning & Testings Accessories

	FENZY (BACOU-DALLOZ)				INTERSPIRO ASIA & PACIFIC		
SET	**Fenzy Aeris**	**Fenzy Aeris Plus**	**Fenzy Bipack**	**Fenzy 5500**	**Spiromatic QS**	**Spiromatic QS**	**Spirotroniq**
ORIGIN	France	France	France	France	Sweden	Sweden	Sweden
WEIGHT EXC. CYLINDER	3.6KG	6.0KG	5.KG	3.6KG	3.83KG	3.83KG	4.5KG
DURATION (SINGLE)	51 mins	67 mins	70 mins	45 mins	40 min. (Nominal)	40 min. (Nominal)	40 min. (Nominal)
TWINNING	Yes	No	Yes	No	Yes	Cylinder Pack	Yes
PRESSURE	200 / 300 bar	300 bar	300 bar	200 / 300 bar	200 / 300 bar	200 / 300 bar	200 / 300 bar
CONTENTS GAUGE	Mechanical or Electronic	Mechanical or Electronic	Mechanical or Electronic	Mechanical	Yes	Yes	Digital HUD in Mask
DEMAND VALVE	Plug In Type	Plug In Type	Plug In Type	Plug In Type	Face Piece Mounted	Face Piece Mounted	Face Piece Mounted
DV ACTION	Fully Automatic	Fully Automatic	Fully Automatic	Fully Automatic	Fresh Air Hatch	Fresh Air Hatch	Self Test Function by BAC
DV RESET	Fully Automatic	Fully Automatic	Fully Automatic	Fully Automatic	By Fresh Air Hatch	By Fresh Air Hatch	By Fresh Air Hatch
BUDDY DV	Option	Option	Option	Option	Option	Option	Standard
FRESH AIR	Option	Option	Option	Option	By Hatch	By Hatch	By Hatch
ALARM	Low Pressure Alarm	Low Pressure Alarm	Low Pressure Alarm	Low Pressure Alarm	Whistle	Whistle	Electronic & Visual Alarm
SPEECH AMPLIFIER	Option	Yes	Option	No	Yes	Yes	Yes
AIRLINE / DECON	Option	Option	Option	Option	Option	Option	Standard
BACKPLATE	Composite	Composite	Composite	Composite	Swivel Action	Swivel Action	Swivel Action
PADDED WAIST BELT	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PADDED SHOULDER STRAP	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MASK OPTIONS	Head Up Display	Head Up Display	Head Up Display	Head Up Display	Various Visors Incl. Laminated Glass	Various Visors Incl. Laminated Glass	Various Visors Incl. Laminated Glass
MASK SPIDER	Nomex Net Helmet attachment	Nomex Net Helmet attachment	Nomex Net Helmet attachment	Nomex Net Helmet attachment	Natural Rubber Mix & Silicone Mix	Natural Rubber Mix & Silicone Mix	Natural Rubber Mix & Silicone Mix
ACCESSORIES	Automatic Distress Signal Unit	Automatic Distress Signal Unit	Automatic Distress Signal Unit	Automatic Distress Signal Unit	ADSU Radio Interface Revitox Rescue Mask Rescue Hose Chemical Suit Interface	ADSU Radio Interface Revitox Rescue Mask Rescue Hose Chemical Suit Interface	ADSU Radio Interface Revitox Rescue Mask Rescue Hose Chemical Suit Interface

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	INTERNATIONAL SAFETY INSTRUMENTS (ISI)	MSA	
SET	**Viking Digital**	**Ultralite R & Custom 4500 MMR**	**Ultralite R II Custom 4500 II BMR**
ORIGIN	USA	USA	USA
WEIGHT EXC. CYLINDER	4.8KG	12.8 lbs	12.8 lbs
DURATION (SINGLE)	"30, 45 or 60 min"	30, 45 & 60 mins	30, 45 & 60 mins
TWINNING	Option	No	No
PRESSURE	2216 or 4500 psi	2216 to 4500 psi	2216 to 4500 psi
CONTENTS GAUGE	Digital	Over shoulder front display	Over shoulder front display
DEMAND VALVE	Airswitch DEV	Mask Mounted with Bypass	Mask Mounted with Bypass
DV ACTION	Slide Button	Constant Positive Pressure	Constant Positive Pressure
DV RESET	None	-	-
BUDDY DV	Yes	Optional	No
FRESH AIR	Switch	Remove Mask Mounted Regulator	Disconnect Supply Tube
ALARM	Bell & Lights in Facemask	Cylinder Alarm – Bell Redundant Alarm – Tone & LED Indicators Optional Motion Detector and Heat Alarms – 3 Levels	Cylinder Alarm – Bell Redundant Alarm – Tone & LED Indicators Optional Motion Detector and Heat Alarms – 3 Levels
SPEECH AMPLIFIER	Yes	Mechanical – Optional battery Operated	Mechanical – Optional battery Operated
AIRLINE / DECON	Option	Optional	Optional
BACKPLATE	Padded Kevlar Harnesses	Glass Reinforced Thermoset Plastic (Vulcan TM) Anodised Aluminum (Black Rhino TM)	Glass Reinforced Thermoset Plastic (Vulcan TM) Anodised Aluminum (Black Rhino TM)
PADDED WAIST BELT	Padded Kevlar Harnesses	Optional	Optional
PADDED SHOULDER STRAP	Padded Kevlar Harnesses	Yes	Yes
MASK OPTIONS	Small, Medium or Large Silicone Facemask	Hycar Rubber or Silicone	Hycar Rubber or Silicone
MASK SPIDER	Kevlar Net Head Harness	Kevlar or Rubber	Kevlar or Rubber
ACCESSORIES	In Mask Light Display Waterproof Microphone Fully Submersible Facemask & Regulator Flashing Locator Lights Control Console	Quick-fill R EBS Communication System Integrated Computer Module continuously monitors pressure, temperature, remaining service time, battery capacity and provides datalogging and downloading of information	Quick-fill R EBS Communication System Integrated Computer Module continuously monitors pressure, temperature, remaining service time, battery capacity and provides datalogging and downloading of information

	PROTECTOR TECHNOLOGIES					
SET	**Sigma-2-PS**	**Sigma-2-FB-PS**	**CTR-100**	**CTR-300**	**CTR-500**	**Cen-paq**
ORIGIN	UK	UK	UK	UK	UK	UK
WEIGHT EXC. CYLINDER	2.9KG	2.9KG	3.0KG	3.0KG	3.2KG	2.8KG
DURATION (SINGLE)	Universal 200-300 bar	Universal 200-300 bar	Universal 200-300 bar	Universal 200-300 bar	Universal 200-300 bar	Universal 200-300 bar
TWINNING	30-61 minutes	30-61 mins	30-61 mins	30-61 mins	30-92 mins	15-30 mins
PRESSURE	200 / 300 bar	200 / 300 bar	200 / 300 bar	200 / 300 bar	200 / 300 bar	200 / 300 bar
CONTENTS GAUGE	Bourdon tube type	Bourdon tube type	Bourdon tube type	Bourdon tube type	Bourdon tube type	Bourdon tube type
DEMAND VALVE	Low-Profile Side Mounted with Bypass	Low-Profile Side Mounted with Bypass	Low-Profile Side Mounted with Bypass	Low-Profile Side Mounted with Bypass	Low-Profile Side Mounted with Bypass	Low-Profile Side Mounted with Bypass
DV ACTION	Instant Positive Pressure	First Breath	First Breath	First Breath	First Breath	First Breath
DV RESET	No	Reset Button	Reset Button	Reset Button	Reset Button	Reset Button
BUDDY DV	No	No	No	"Option with AC, RSM and Split DV"	"Option with AC, RSM and Split	No
FRESH AIR	No	No	No	No	No	No
ALARM	Whistle	Whistle	Whistle	Whistle or optional Mask mounted display	Whistle or optional Mask mounted display	Whistle
SPEECH AMPLIFIER	Option	Option	Option	Option	Option	Option
AIRLINE / DECON	No	No	Option CTR 110 / CTR 120	Option CTR 310 / CTR 320	Option CTR 510 / CTR 520	No / Option
BACKPLATE	Composite material	Composite material	Composite material	Composite material	Composite material	Jacket
PADDED WAIST BELT	No	No	No	optional with Full backpad	Yes	Yes
PADDED SHOULDER STRAP	No	No	No	Yes	Yes	Yes
MASK OPTIONS	PanaSeal, Panavisor, Vision 3 (3 different sizes)	PanaSeal, Panavisor, Vision 3 (3 different sizes)	PanaSeal, Panavisor, Vision 3 (3 different sizes)	PanaSeal, Panavisor, Vision 3 (3 different sizes)	PanaSeal, Panavisor, Vision 3 (3 different sizes)	PanaSeal, Panavisor, Vision 3 (3 different sizes)
MASK SPIDER	Rubber Spider or Net	Rubber Spider or Net	Rubber Spider or Net	Rubber Spider or Net	Rubber Spider or Net	Rubber Spider or Net
ACCESSORIES	Facemask Bags Wall Cabinets Carrying Cases	Facemask Bags Wall Cabinets Carrying Cases	Mask Mounted Comms Interface Mask Mounted Pressure Display Black Box Datalogger	Mask Mounted Comms Interface Mask Mounted Pressure Mask Display Black Box Datalogger	Mask Mounted Comms Interface Mounted Pressure Display Black Box Datalogger	Facemask Bags Wall Cabinets Carrying Cases

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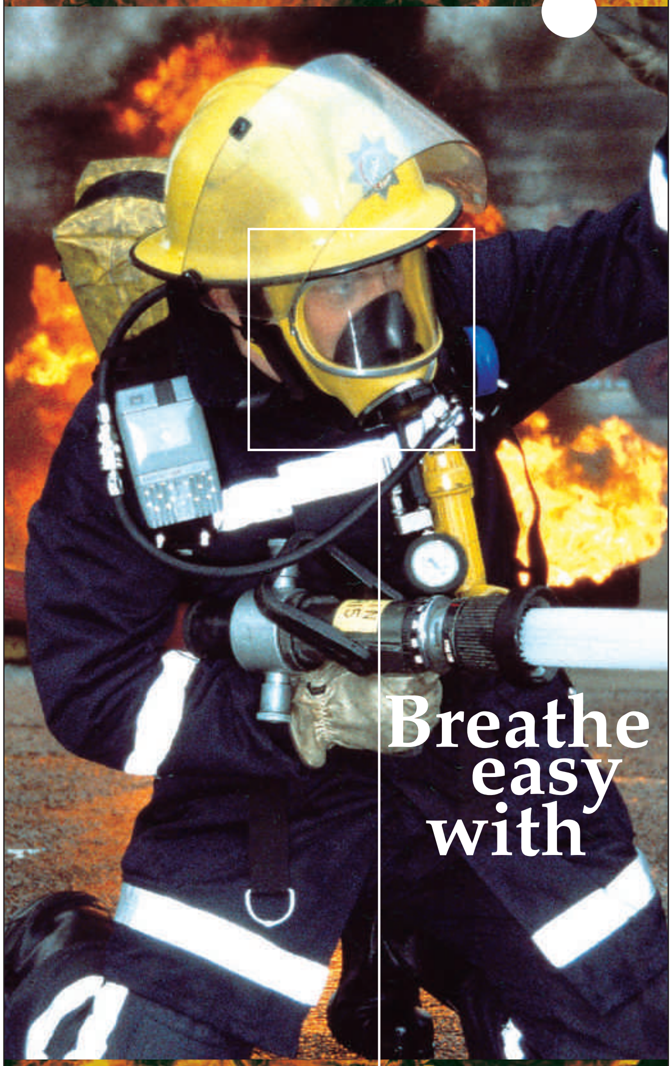

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Intumescent Wrap Strip Firestopping Products

By RICH BYRNE
of the International Firestop Council

THE FIRE PROTECTION CHALLENGE

Firestop products offer a variety of passive fire protection features for protecting opening in fire-rated walls, ceilings, roofs, doors and windows, and through-penetration firestops for items such as wires, conduit, and pipes. Passive fire protection is designed to contain a fire within the area in which it starts, and to prevent loss of life by restricting the spread of fire and combustion products

One important example of passive firestopping is the sealing of through-penetrations made in rated walls and floors for vented plastic pipes. The combustible nature of these plastic components presents a far more challenging fire hazard than is posed by metal pipe or conduit penetration because they may melt or burn and create a passage for smoke and flame to spread quickly into adjoining rooms or floors. Plastic pipes encompass a variety of materials that include PVC, CPVC, cc-PVC, ABS, cc-ABS, PVDF, PP, PB, PEX, and FRPP.

Fortunately, there are several plastic pipe firestopping options, each of which has been designed to close off plastic pipes under fire conditions so as to prevent fire and hot gases from breaching the opening in a fire-rated wall or floor. Plastic pipe firestop components consist of wrap strips, restricting collars, sleeves, and intumescent sealants.

Through-penetration firestop seals commonly rely on a property known as intumescence, which means that they expand substantially in volume when exposed to heat. Intumescent products must have sufficient and highly directional force to completely seal off combustible pipes and the voids that are created by them when there is a fire, and activate early enough to begin squeezing a pipe shut before fire can burn through the inside of the pipe.

Wrap Strips are flexible, resilient ribbons of highly intumescent firestop material used to firestop plastic pipe through-penetration applications. When exposed to heat, these products expand in volume (as much as ten times their initial volume) to form a dense char that seals the opening left by the burned or melted pipe, thus preventing the passage of flames and hot gases through the opening. This char must be hard and solid so as to resist shifting and withstand the force of a water stream.

> *Wrap Strips are flexible, resilient ribbons of highly intumescent firestop material used to firestop plastic pipe through-penetration applications.*

Intumescent Wrap Strip Firestopping Products

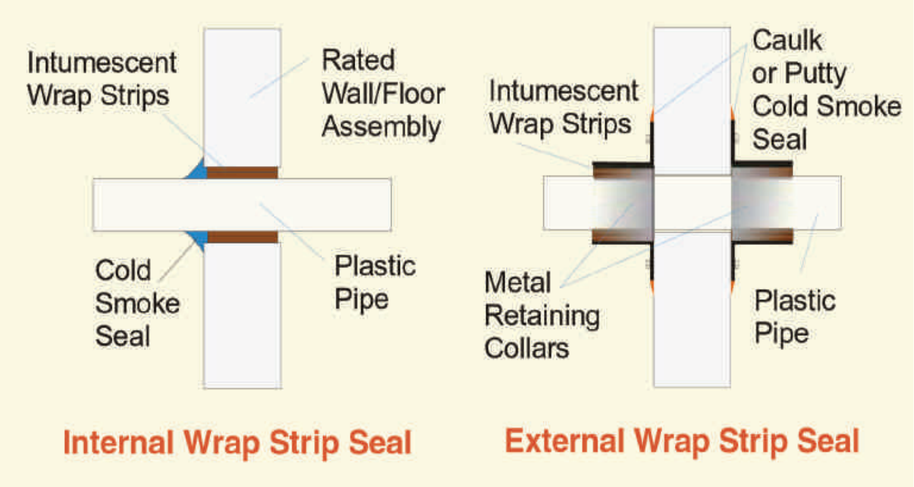

Fig. 1 A plastic pipe firestop can be installed either internally or externally, depending on construction circumstances.

An intumescent wrap strip is typically installed by wrapping the pipe with a specified number of layers. The number of wraps required for effective fire protection depends on the specifics of the system. Typically the larger the diameter of pipe, the more layers of wrap are required.

For example, 3-in. PVC pipe may be effectively firestopped with a single layer of wrap strip, whereas two layers may be required for a 4-in. diameter pipe. Wrap requirements are also dependent on the type of plastic in question. PVDF pipe tends to soften and melt more rapidly in a fire than PVC, and thus more wraps are required for PVDF pipes in order to close the opening more quickly.

INSTALLATION OPTIONS

The approved method for installation of each intumescent wrap strip product on a given diameter and plastic pipe material is covered in the pertinent U.S. Fire Resistance Directory listing for that company's product. Plastic pipe firestop systems are generally installed in one of two ways depending on construction circumstances. When there is sufficient annular space, they can be installed around the pipe, internal to the wall or floor assembly. Where annular space is restricted, they are placed externally, against the outside surface on either side of the wall or floor (Figure 1). In either case, the wrap strip material must be wrapped tightly and evenly around the pipe.

In the case of internal wrap strip installations, or "tuck-in", the expanding intumescent seal pushes against the inner surface of the rated assembly to close the opening. An externally applied firestop acts against its metal retaining collar to confine the expanding wrap strip and cause it to fill the opening left by a melted or burned pipe.

External plastic pipe firestops can be accomplished using one of several premade metal assemblies containing intumescent wrap strips, or built up by wrapping a pipe with wrap strip, and then applying a separate metal restricting collar that is bolted to the wall or floor.

In either case, the pipe must be wrapped with the required number of layers based on pipe material and diameter. For plastic pipe penetrations using the internal firestop method, the intumescent wrap is generally recessed from the surface approximately •-in. to allow for application of a rated cold smoke seal material. This smoke seal may be a silicone-based sealant, or an water based intumescent caulk. Either will restrict passage of smoke under fire conditions when the temperature is not elevated to the point of intumescent activation.

Wrap strips can be applied continuously around a plastic pipe until the number of required layers is met, or applied in individual layers with ends off-set and lapped to reach the required thickness.

TESTING

Approved intumescent firestop materials must be classified by Underwriters Laboratories and Factory Mutual, and tested in accordance with ASTM E 814/UL 1479 "Test Standard for Through-penetration Firestops". The ASTM and UL standards require that the installed product exhibit resistance to positive pressure at a minimum of .01 inches (2.5 Pa) of water. Some U.S. products also meet the requirements of U.L. Canada (CAN4-S115M), which

> *As with all firestop products, this material should be used only as described in tested systems or as recommended in a confirmed engineering judgment by a qualified manufacturer.*

Wrap strip – courtesy of Hilti.

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Examples of Plastic Pipe Wrap Strip Products*

SPECIFICATION	Rectorseal Metacaulk Wrap Strip	Hilti CP-645 Firestop Wrap Strip	WR Grace FlameSafe Wrap Strip	3M Fire Barrier FS-195+ Wrap/Strip	3M Interam™ Graphite Mat Ultra GS	Specified Technologies, Inc. SpecSeal® RED Wrap Strip	Specified Technologies, Inc. Spec Seal® BLU Wrap Strip
Dimensions	1"x1/4"x12' 2"x1/4"x12'	1"x1/4"x25' 2"x1/4"x25'	1"x1/4"x12' 1.5"x1/4"x12'	2"x1/4"x24" (foil-backed)	2"x1/8"x40'	1-1/2" x 1/4" x 12'	2" x 3/16" x 12'
Activation Temp.	375°F/190°C	375°F/190°C	250°F/121°C	300°F/150°C	410°F/210°C	250°F/121°C	250°F/121°C
Max. Pipe Dia.	Not avail.	8"	Not avail.	10"	Not avail.	Not avail.	10"
UL Fire Rating	Up to 3 hrs.	Up to 3 hrs.	Up to 3 hrs.	Up to 3 hrs.	Up to 3 hrs.	Up to 3 hrs.	Up to 3 hrs.

*For further information about other intumescent wrap strip products and other firestop product manufacturers, please consult the International Firestop Council Web site @ www.firestop.org

requires that vented plastic pipes be tested with a positive pressure of 50 Pa, which is substantially higher than the 2.5 Pa required by the ASTM E 814 test method. These industry specifications define the plastic pipe material, pipe diameters, and the type and thickness of penetrated floor/wall assemblies.

Intumescent wrap strip products must be tested under UL-approved conditions to qualify the minimum number of wraps that are required to effectively firestop various types and diameters of pipes. The resulting test data allows users to install the most cost-effective pipe wrap assembly capable of meeting firestop performance standards.

Wrap strips for plastic pipe firestopping should be approved as a Class A Building Materials, with a flame spread of 5 and a smoke development index of 5 when tested in accordance with ASTM E 84. A wrap strip product should also be UL Listed as a Fill, Void or Cavity Material, and FM approved for firestopping plastic pipes. As with

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all firestop products, this material should be used only as described in tested systems or as recommended in a confirmed engineering judgment by a qualified manufacturer.

PRODUCT

Options Wrap strip materials begin to expand at pre-determined temperature levels established by each manufacturer (see Table 1), increasing in volume to 10 times or more of the original size. This material is typically provided in rolls or strips of several widths, with a common thickness of 1 in. Wrap strip physical properties and construction also vary by manufacturer. One product is made with a foil backing, another with a polyethylene liner. The various products differ in color and appearance, but each has essentially equivalent functionality.

Users should review application requirements and published product specifications in the product selection process. Important product qualification issues include testing to industry standards, U.L. listing of applications, product shelf life, applicability to pertinent pipe materials and diameters, mechanical flexibility, aging properties (stability and performance in place), ease of installation, accessory items, availability, technical support, and training services.

For Further information on Firestopping products and a full list of Firestopping manufacturers, contact the International Firestop Council (IFC). The IFC is a not-for-profit association of manufacturers, distributors and installers of fire protective materials and systems. IFC's mission is to promote the technology of fire containment in modern building construction through research, education and development of safety standards and code provisions.

International Firestop Council
25 North Broadway
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USA
Tel: +1 914 332 0040
Fax: +1 914 332 1541
E-mail: info@firestop.org
Website: www.firestop.org

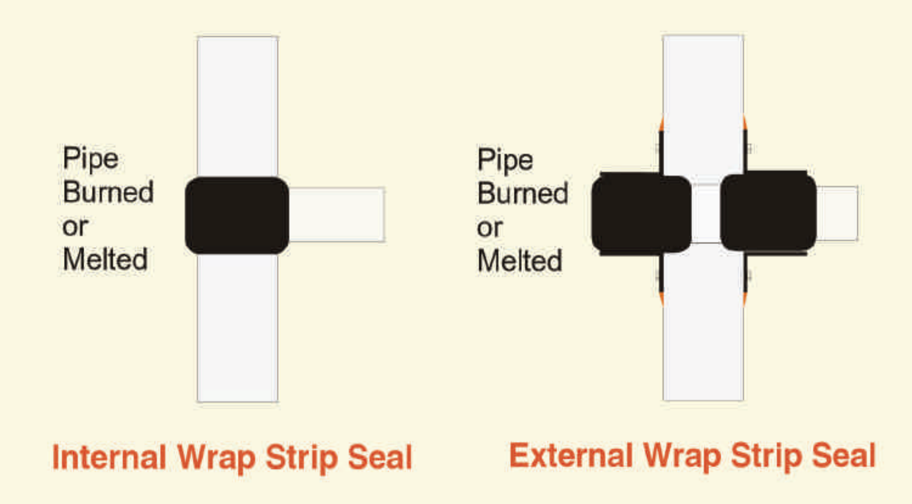
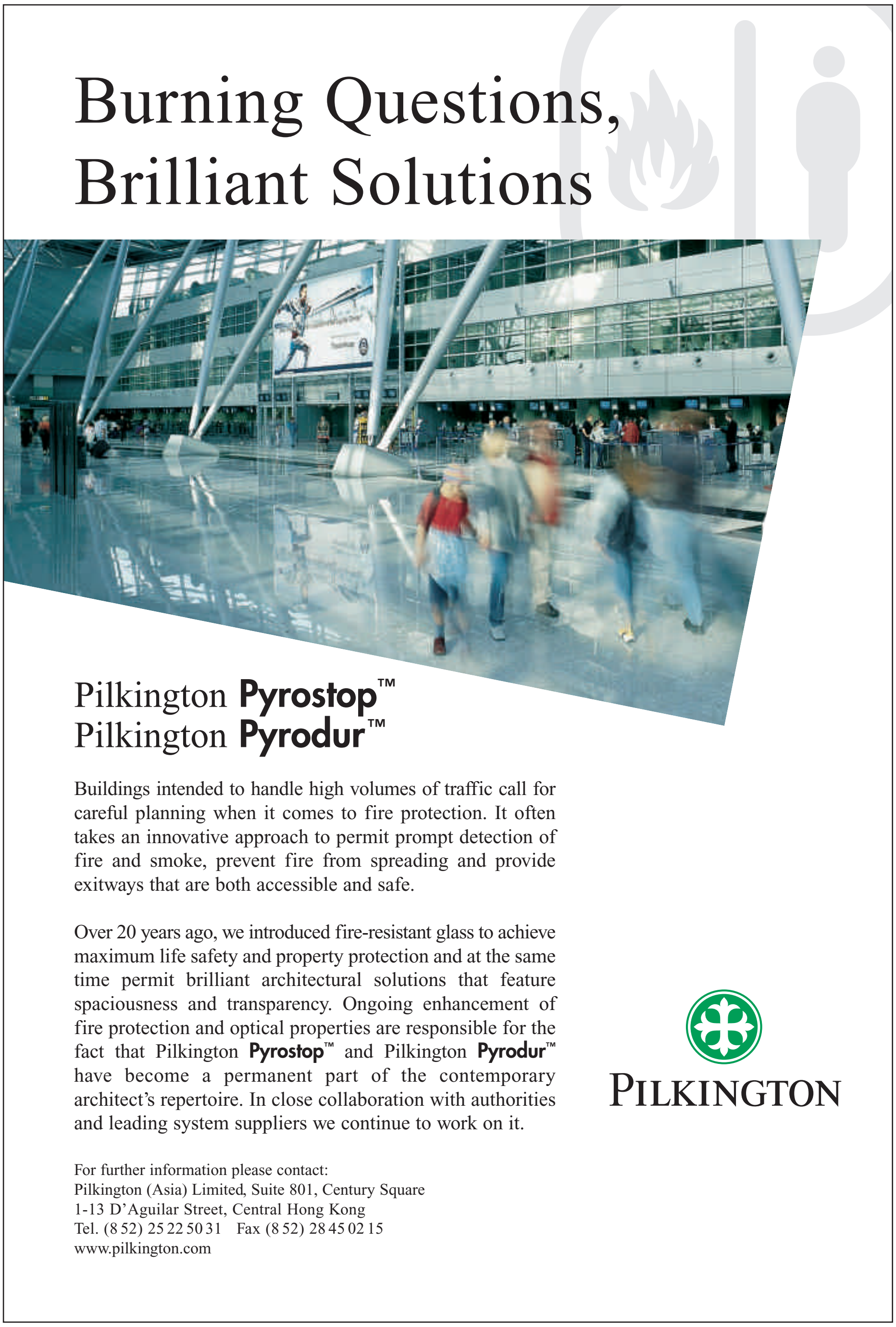


Fig. 2 In the event of a fire the intumescent wrap strip expands to fill the void left by a burned or melted plastic pipe, restricting passage of smoke through a rated partition.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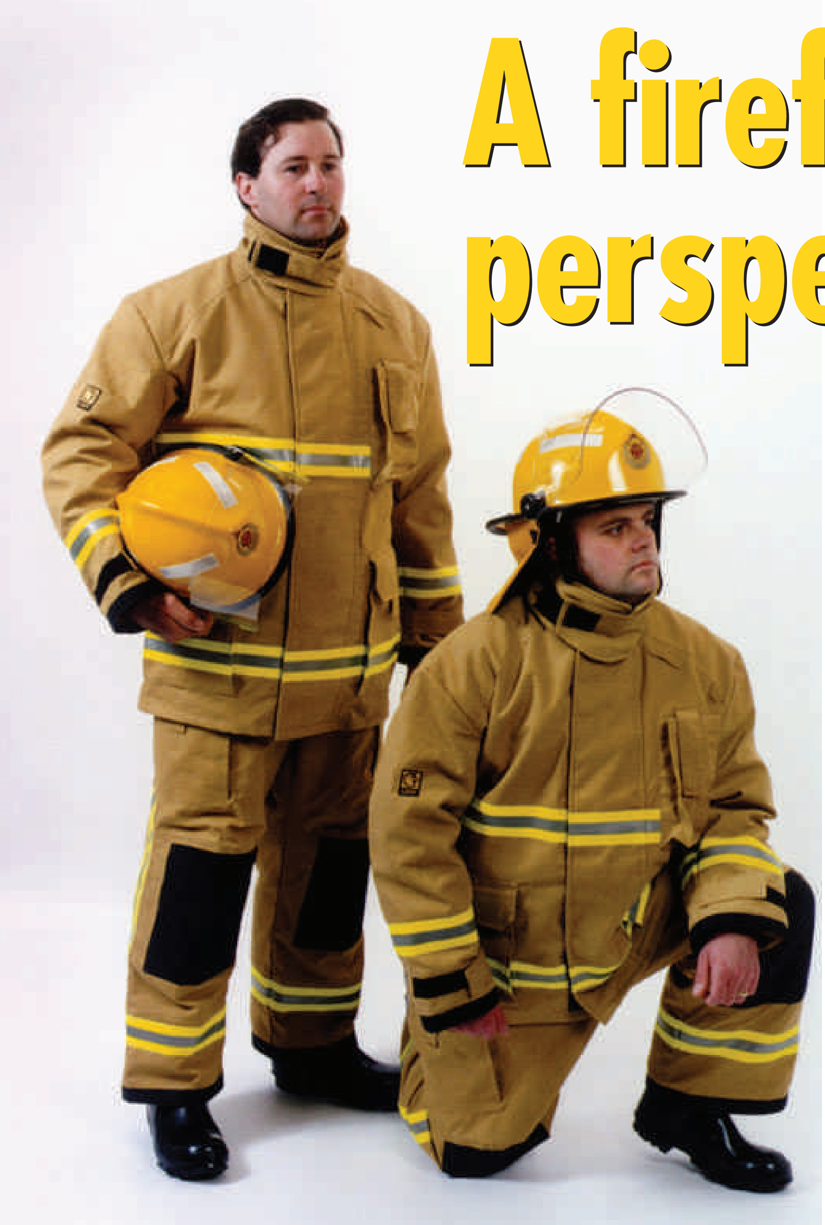

Picture courtesy of Lion Apparel Asia Pacific

A firefighter's perspective . . .

. . . on the importance of developing international standards for firefighters PPE

by Russell Shephard

WHEN I WAS ASKED to write an article on firefighters Personal Protective Equipment (PPE) I thought it appropriate to address the issue of PPE and the Standards process as it relates to a firefighter and the importance of that. More technical issues I will leave to those who are more qualified than myself.

Firstly I should explain that I am a firefighter of some 25 years with the Australian Capital Territory Fire Brigade. I have been involved in the development of firefighters' PPE and Australian and International Standards for the past 15 years.

It should be noted that along with the firefighters training, PPE is the first line of defence to prevent serious injury or even death. In general terms the objectives of a firefighter upon reaching an incident can be summarised as follows:

- The saving of life and the provision of humanitarian services.
- The prevention or minimisation of damage to property.
- The prevention or minimisation of damage to the environment.

The function of the firefighters PPE is to protect the firefighters whilst enabling them to achieve their objectives. In addition, in an emergency situation where it is impossible to achieve the objectives, the PPE should safeguard the firefighter allowing him/her to escape to a place of safety.

The PPE is manufactured to specific standards that provide levels of performance requirements for firefighters. Employers have a responsibility to carry out a risk assessment in the workplace before deciding on the type of PPE that is most suitable to protect the personnel under their control. The duties and responsibilities of firefighters are taken into account when assessing the risk and the appropriate PPE selected using the National or International Standard required. In this way operational procedures and different concepts of safety both play a part in leading to the levels of performance chosen.

Firefighters PPE includes, but is not limited to, such things as:

A firefighter's perspective . . .

Picture courtesy of Lion Apparel Asia Pacific

- Fire tunic
- Overpants
- Boots
- Gloves
- Helmet
- Hoods
- Breathing apparatus.

From a firefighters perspective it is critical for our health and safety that the development of standards for firefighters PPE is supported by the involvement of the end user, being the firefighter.

Throughout the world firefighters' PPE varies, with most of it made to various International Standards and in the worst cases made to no standard at all. Many different types of materials are utilised to manufacture PPE with each Fire Service having its own particular needs and requirements. In general terms all firefighters around the world, by the nature of their work, have the same requirements from the PPE and that is to carry out their duties with the best possible equipment made to sound performance based International Standards that have been developed with the involvement of experts in their field, however, this must also include the end user.

It is also recognised that there has to be a balance between protection of the firefighter and the level of metabolic heat build up from the clothing. What cannot be forgotten, however, is that the firefighter must always be properly protected against any risk that may be encountered.

The involvement of many key people working with manufacturers of materials and garments and that work being translated into International Standards, the design and quality of PPE that has been produced in recent years has come a long way to addressing some of these issues.

For many years some International Standards Committees developing standards for the firefighting industry have had limited involvement from the end users. This has not been because firefighters have been kept out of such committees, but more the problems associated with getting the end users involved. Australian Fire Services and the Australian Standards organisation have made it possible for myself and others to play a part in these developments by providing support both financially or otherwise.

It should be noted that throughout Europe, Australia and the United States some key people have been working hard to ensure that the best possible standards are developed for the firefighting industry. However, if we are going to continue to meet the needs of our changing work environment and the change in roles and responsibilities of firefighters, we need to look at how we can get more of the end users to work with experts to develop more effective and efficient standards.

One of the ways this is being achieved is with the establishment of the new ISO/TC94/SC14 Committee, which held its inaugural meeting in London, England during the week of 8 October 2001. The purpose of this committee was not to replace those dedicated and experienced people who had been working on the development of the standards in the past, but to have a committee that would focus specifically on firefighters PPE, while enhancing the structure of the committee with the involvement of more end users.

It is proposed that the committee will meet for approximately one week every six months to develop and debate crucial aspects of the standards.

As well as firefighters other participants active in the work undertaken by the ISO/TC94/SC14 include Fire Services, researchers, textile and product manufacturers, designers, testing laboratories and regulators.

The countries that are currently involved in the committee are:

Australia
Austria
Belgium
Canada
Denmark
Finland
France
Germany
Ireland
Italy
Japan
New Zealand
Saudi Arabia
Slovenia
South Africa
Sweden
Switzerland
United Kingdom
USA
Slovakia
Venezuela

This committee would also be able to look at the way items of PPE integrate with other items of PPE to ensure that it all works as part of an overall compatible system to protect the firefighter.

One of the first issues to be dealt with by the committee was the development of a business plan. While this business plan is still in the DRAFT stage and will not be endorsed until the next meeting in April 2002 I would like to include some of the key areas such as the scope, objectives, strategies and the work program to give an indication of the work being carried out.

SCOPE

Standardisation of the quality and performance of protective clothing and personal equipment intended to safeguard firefighters against hazards encountered in the performance of their duties.

OBJECTIVES

- To ensure the health, safety and effectiveness of firefighters through the establishment of minimum standards on firefighters PPE for the various functions.
- To move away from prescriptive-based requirements in standards to a performance-based approach in all areas of firefighters personal safety. This is particularly evident in the area of firefighter protection where there have been many advances in testing methods and procedures.

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- A primary goal of SC14 is to have in place ISO Standards for all major classes of firefighters' PPE.
- To prepare and maintain in a timely and cost effective manner ISO Standards and other ISO deliverables concerned with firefighters PPE, for which a need has been identified.
- To ensure as far as practical the safety of persons using the PPE.
- To ensure as far as practical the appropriateness of product function and performance.
- To provide means for the Integration of various items of firefighters' PPE.
- To provide a basis for testing, certification and when necessary regulation of products
- To minimise obstacles to international trade.
- To promote the active participation of fire services in the development of standards used for firefighters' PPE.
- To provide guidance on selection, care, use and maintenance used for firefighters' PPE.
- To wherever practical, ensure compatibility and consistency between components of firefighters' PPE.

STRATEGIES TO REACH OBJECTIVES

To develop ISO standards based on the identified needs of firefighters, or by the adoption either directly or with modification, standards prepared by other organisations.

The standards products prepared to achieve the ISO/TC94/SC14 objectives will include:

- Performance requirements
- Responsibilities of manufacturers
- The use of existing ISO test methods

In addition to these, standards and technical reports will be prepared when the need is identified.

To achieve these strategies the technical program of work is divided between Working Groups representing functional areas of firefighters' activity, including, but not limited to, firefighting, rescue, chemical and biological hazards.

When necessary, the Working Groups will further be divided into Project Groups to develop performance standards on specific activities.

The performance standards will cover all parts of the PPE intended to provide protection to the firefighter for the relevant function.

FACTORS AFFECTING IMPLEMENTATION OF WORK PROGRAM

It is the intention of ISO/TC94/SC14 to carry out its work expeditiously.

Priorities will be established and where necessary referred to the appropriate Working Group. The Working Group shall complete its work expeditiously and report on a regular and agreed basis to SC14.

Electronic means (computers and e-mail) will be used for speedy communication.

Appropriate technology shall be available at meetings to allow delegates to work effectively and to aid in communications.

There will be occasions and or events, which cause SC14 to reschedule work items or introduce new ones as a priority. This should be undertaken in a manner that will cause as little delay as is possible to existing work items.

WORK PROGRAM

There shall be five (5) Working Groups established covering:

WG 1 GENERAL

General requirements for personal protective equipment used by firefighters.

Terms of reference:

1. To harmonise existing standards and develop new general requirements standards for PPE used by firefighters where none exists.
2. To develop selection, care use and maintenance deliverables for PPE used by firefighters where none exists.

WG 2 FIREFIGHTING

PPE used by firefighters during firefighting (excluding wildland firefighting).

Terms of reference:

1. To harmonise existing standards and develop new standards for firefighters PPE where none exists.
2. To develop selection, care, use and maintenance deliverables for firefighters PPE where none exists.

WG 3 WILDLAND FIREFIGHTING

PPE used by firefighters during wildland firefighting.

Terms of reference:

1. To harmonise existing standards and develop new standards for wildland firefighters PPE where none exists.
2. To develop selection, care, use and maintenance deliverables for wildland firefighters PPE where none exists.

WG 4 HAZARDOUS MATERIALS

PPE used by firefighters during hazardous materials incidents.

Terms of reference:

1. To harmonise existing standards and to develop, where none exist, new standards for firefighters' PPE for protection against chemical and biological risks.
2. To develop selection, care and maintenance deliverables for chemical and biological PPE where none exists.

WG 5 RESCUE

PPE used by firefighters during non-fire related rescue incidents.

Terms of reference:

1. To harmonise existing standards and develop new standards for PPE for protection of firefighters engaged in general and specialised rescue activities where none exists.
2. To develop selection, care, use and maintenance deliverables for PPE used by firefighters for general and specialised rescue activities where none exists.

Under these headings, standards will be either adopted where they exist and where appropriate or new standards will be developed where they are required. The main items that will be addressed are

- Clothing
- Helmet
- Footwear
- Gloves
- Breathing apparatus
- Hearing protectors
- Eye protectors

While some of the components of the Draft Business Plan may change by the time of the April meeting, I believe that the basic objectives of the committee will mostly remain the same.

AS YOU CAN SEE the tasks ahead for the committee are enormous and will require substantial commitment from all parties involved if we are going to continue to advance improvements in firefighters PPE. All firefighters around the world rely on their PPE on a daily basis for protection against the ever changing conditions they face and I am confident that the ISO/TC94/SC14 committee along with many other committees and working groups will continue to assist with those improvements.

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Research Involving 55-Gallon Drums Stored on Racks

By Martin J. Pabich, P.E. and Nora-Cay Ryan

Picture courtesy of Underwriters Laboratories

***Warehouse rack storage** of flammable and combustible liquids in metal 55-gallon (208 ltr) drums has long been a practice employed by paint manufacturers, pharmaceutical manufacturers and others in the chemical and petroleum industries. In the United States, this has led to the development of codes and standards, which provide the methods and guidelines that set a minimum standard of safety. These documents are used by communities to create regulations intended to decrease the chance of an unwanted fire.*

G.E. Global Asset Protection Services, formerly Industrial Risk Insurers, was concerned about the fire protection of rack storage of flammable and combustible liquids in metal 55-gallon (208 ltr) drums specified in the *National Fire Protection Association Flammable and Combustible Liquids Code*, NFPA 30 – 2000. As with others in the insurance community, G.E. Global Asset Protection Services relies on codes and standards to assist in the development of fire protection criteria.

Insurance companies dealing with highly protected risks have many concerns when it comes to underwriting the insurance. Many of these policies have very large deductibles and premiums depending on value and risk. Properly installed and maintained is an effective means to minimize the risk associated with fire.

In order to achieve proper fire protection, many issues are evaluated. One of these issues is will the passive and active fire protection systems work sufficiently to handle the expected risk.

With flammable and combustible liquids, there is a greater risk of spill and fire associated with the storage. The protection criteria identified in Chapter 4 of NFPA 30 are based upon type and size of container, type of storage, and class of liquid. Flammable and combustible liquids are classified according to flashpoint. The lower the flashpoint of the liquid the easier the liquid is to ignite.

Picture courtesy of Underwriters Laboratories

The protection tables provided in NFPA 30 are based upon available data from large-scale fire tests, which have been conducted over the years. Because of the impracticality associated with testing every imaginable scenario, carefully engineered fire tests have been instrumental in justifying the use of various protection schemes. The tables also reference the specific fire test a particular fire protection scheme was based on.

Recent Research

The protection of 55-gallon (208 ltr) drum storage in racks has been of keen interest to the fire protection community for a long time. Recently, changes made to the drum closure were investigated during a 1998 Fire Protection Research Foundation (FPRF) of palletized storage research program. Changes have also been made to the materials and methods used to manufacture the steel racking.

The origin of the G.E. Global Asset Protection Services program stems from the *International Intermediate Bulk Container Fire Test Project*[1] conducted by the Fire Protection Research Foundation from 1996-2000 concerning flammable and combustible liquids

Table 1. Test Parameters and Results

TEST NUMBER	1	2	3	4	5
GENERAL TEST PARAMETERS					
Storage Type	Rack	Rack	Rack	Rack	Rack
Container Type	55-Gallon Steel Drums	55-Gallon Steel Drums	55-Gallon Steel Drums	55-Gallon Steel Drums	55-Gallon Steel Drums
Container fill	Water Filled with Flammable Vapor Space	Water Filled with Flammable Vapor Space	Water Filled with Flammable Vapor Space	Water Filled with Flammable Vapor Space	Water Filled with Flammable Vapor Space
Nominal Storage Height (ft)	15	15	15	15	15
Nominal Ceiling Height (ft)	30	30	30	30	30
Nominal Clearance (ft)	14.75	14.75	14.75	14.75	14.75
Spill Fire Location	First tier	Second tier	First tier	Third tier	First tier
CEILING SPRINKLER PARAMETERS					
Ceiling Sprinkler	Standard Spray Upright	Standard Spray Upright	Standard Spray Upright	Standard Spray Upright	Standard Spray Upright
Nominal K-Factor	K-8	K-8	K-8	K-8	K-8
Temperature Rating °F	286 SR	286 SR	286 SR	286 SR	286 SR
Deflector to Ceiling (in)	3	3	3	3	3
Sprinkler Spacing (ft x ft)	10 x 10	10 x 10	10 x 10	10 x 10	10 x 10
Flowing Pressure (psig)	56	56	56	56	56
IN-RACK SPRINKLER PARAMETERS					
In-rack Sprinkler	Pendent	Pendent	Pendent	Pendent	Pendent
Nominal K-Factor	K-8	K-8	K-8	K-8	K-8
Temperature Rating °F	165 QR	165 QR	165 QR	165 QR	165 QR
In-rack Sprinkler Levels (ft.)	5, 15	5,15	5,15	5,15	5,15
Sprinkler Locations	Face and Flue	Face and Flue	Face and Flue	Face and Flue	Flue
In-rack Spacing (ft.)	8	8	8	8	8
In-rack Flowing Pressure (psig)	14	14	14	14	14
2 gpm Heptane Spill Location	Bottom of 1st tier, mid beam	Bottom of 2nd tier, mid beam	Bottom of 1st tier, behind upright	Bottom of 3rd tier, in front of upright	Bottom of 1st tier, mid span
RESULTS					
Length of Test	30 min.	30 min.	30 min.	30 min.	30 min.
First In-rack Sprinkler Operation (M:S)	0:54	1:09	0:06	0:12	2:09
Last In-rack Sprinkler Operation (M:S)	3:12	4:45	1:52	0:14	2:56
Number of Operated In-rack Sprinklers	9	5	4	2	4
Number of Operated Ceiling Sprinklers	0	0	0	1	1
Peak Temperature on Rack Upright °F (°C)	223 (106)	158 (70)	367 (186)	235 (113)	1195 (646)
Rack Damage	No	No	No	No	Yes

SR – Standard Response QR – Quick Response

stored and shipped in intermediate bulk containers (IBCs). The last phase of a three-phase program was conducted using IBCs stored in racks, which resulted in collapse of the rack upright.

It was recognized that there was more weight being transferred through the rack upright with IBCs compared to 4 drums positioned on a wood pallet. However, there was concern that the drum storage would present a challenge to the steel uprights when they are involved in a flammable liquids spill fire.

Description of G.E. Global Asset Protection Services Sponsored Research

To investigate the protection of 55-gallon (208 ltr) drums stored on racks, G.E. Global Asset Protection Services sponsored a series of five tests. The fire tests were conducted at Underwriters Laboratories Large-Scale Fire Test Facility in Northbrook, Illinois, USA. The tests evaluated the level of protection achieved with a water only ceiling and in-rack sprinkler system protecting steel drums with plastic closures containing IB, IC, II or IIIA class liquids on steel racks.

Picture courtesy of Underwriters Laboratories

The racking used for this test series was commercially available uprights and beams rated to hold 30,000 lbs. (13,608 kg). On average, each hardwood pallet weighed 52 lbs. (23.6 kg) and each filled 55-gallon (208 ltr) drum weighed 465 lbs. (210.9 kg).

All the tests utilized three-tier double-row racks with in-rack sprinkler protection. The tiers were located 5, 10 and 15-ft (1.52, 3.05 and 4.57 m) off the floor. Four, 55-gallon (208 ltr) steel drums positioned on a hardwood pallet were loaded onto the racks. The drums were filled with 55-gallons (208 ltr) of water and topped off with 1 quart (.95 ltr) of heptane to create a flammable vapor space.

The in-rack sprinklers were pendent style, quick response sprinklers with a temperature rating of 165ºF (74ºC). They had a discharge coefficient, K=8 (gpm)/(psi)$^{1/2}$ (K=11.7(dm^3/min)/(kPa)$^{1/2}$). The in-rack water system was set to provide a water pressure of 14 psi (96.46 kPa) at the top (15-ft) level.

Ceiling sprinkler protection was positioned on 10 by 10-ft (3.05 by 3.05 m) spacing at approximately 30-ft (9.14 m) above the floor. The ceiling sprinklers were upright style, standard response sprinklers with a temperature rating of 286ºF (141ºC). They had a nominal discharge coefficient, K=8 (gpm)/(psi)$^{1/2}$ (K=11.7(dm^3/min)/(kPa)$^{1/2}$). The ceiling water system was set to provide a discharge density of 0.60 gpm/ft? (24.4 mm/min).

A three-tier single-row target rack was set-up across an 8-ft (2.43 m) aisle space. The tiers were located 5, 10 and 15-ft (1.52, 3.05 and 4.57 m) off the floor. Four 55-gallon (208 ltr) steel drums positioned on a hardwood pallet were loaded onto the rack. The drums were filled with 55-gallons (208 ltr) of water and 1 quart (0.95 ltr) of heptane to create a flammable vapor space.

A continuous 2 gpm (7.58 ltr/min) heptane spill was used as the fire source in the tests. The heptane spill location was positioned at various elevations for each test. The pallet arrangement was shifted for each test to keep the heptane spill in the center of the drums.

Test Results

In Test 1, two levels of face and staggered flue in-rack sprinklers were used with the heptane spill located at the floor away from a rack upright. Nine in-rack sprinklers operated and provided protection for the rack structure and stored drums for the 30-minute test duration. No ceiling sprinklers operated.

In Test 2, two levels of face and staggered flue in-rack sprinklers were used with the spill located at the base of the second level of storage away from a rack upright. Five in-rack sprinklers operated. The rack structure and stored drums remained intact for the 30-minute test duration. No ceiling sprinklers operated.

Test 3 used two levels of face and staggered flue in-rack sprinklers with the spill fire located at the base of the first level of storage adjacent to a rack upright. Four in-rack sprinklers operated which protected the rack structure and stored drums for the 30-minute test duration. No ceiling sprinklers operated.

Test 4 used two levels of face and staggered flue in-rack sprinklers with the heptane spill fire located at the base of the third level of storage adjacent to a rack upright. Two in-rack sprinklers operated and protected the rack structure and stored drums from the fire insult for the 30-minute test duration. One ceiling sprinkler operated.

In Test 5, two levels of staggered flue in-rack sprinklers were used with the spill fire located at the base of the first level of storage away from a rack upright. Four in-rack sprinklers operated, but were not able to protect the rack structure from damage. Drums located in the second tier of storage dropped into the aisle space approximately 22 minutes after ignition. One ceiling sprinkler operated in test No. 5.

Summary

The tests conducted during this series show that rack uprights can be protected using face in-rack sprinklers. There was no rack damage when ceiling sprinklers were combined with face and flue in-rack sprinklers as seen in Tests 1 through 4. However, Test 5 showed rack damage when ceiling sprinklers were combined with only flue in-rack sprinklers.

A summary of the parameters and results is presented in Table 1.

Martin Pabich is a Staff Engineer at Underwriters Laboratories in Northbrook, Illinois, USA. He works in large-scale fire research, a section of the Fire Protection Division of UL.

Nora-Cay Ryan is a Project Handler at Underwriters Laboratories in Northbrook, Illinois, USA. She works in large-scale fire research, a section of the Fire Protection Division of UL.

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[1] ● *Scoping Test*, September 1996
- *Evaluation of Large Arrays*, April 1998
- *Verification Tests and Development of a Standard Evaluation Methodology*, April 1998
- *Rack Storage*, January 2000

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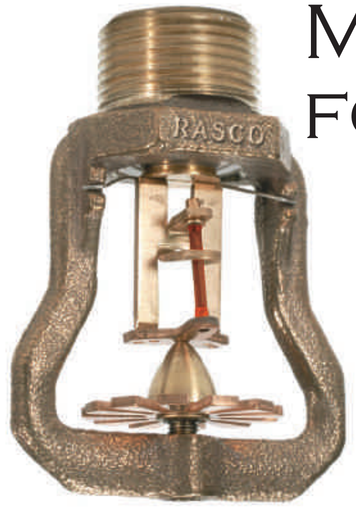

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35′	75 psi	121 gpm	30 psi	138 gpm	35 psi	133 gpm
40′	75 psi	121 gpm	40 psi	159 gpm	45 psi	150 gpm
45′ w/ 35′ stor.	90 psi*	133 gpm*	50 psi	178 gpm	50 psi	158 gpm
45′ w/ 40′ stor.	90 psi*	133 gpm*	50 psi	178 gpm	50 psi	158 gpm

* K.14 Must Include one row of in-rack sprinklers.

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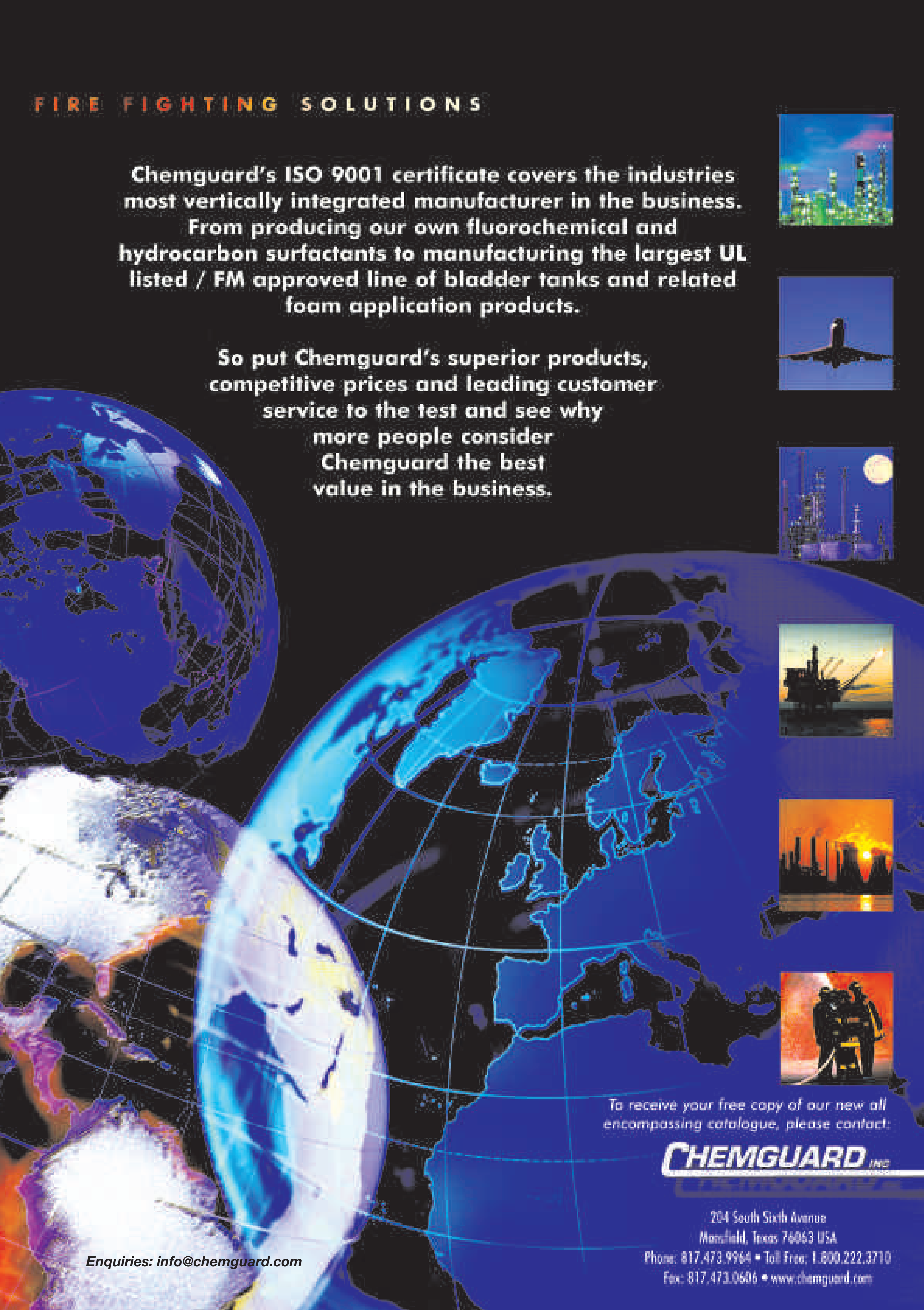

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Fire Fighting Foam Concentrates and Proportioning Rates

by Eric LaVergne

Picture courtesy of Buckeye Fire Equipment

Foam Concentrates:

Since the 1950's foams have been widely accepted in the oil and chemical industries as the preferred extinguishing media when combating flammable and combustible liquids. Defined as a stable aggregation of small bubbles of lower density than oil or water the foam blanket flows over the burning liquid and extinguishes the fire by the following mechanisms.

- Cools the fuel and adjacent metal surfaces
- Smothers the fire and prevents air from mixing with the vapours.
- Suppresses flammable vapours and prevents their release.
- Separates flames from the fuel surface.

Fire fighting foam was recognized in 1887 as a viable tool in extinguishing liquid fires with the introduction of Chemical Foam. Now considered obsolete, chemical foam is produced by the reaction of a combination of an acid salt (i.e. aluminium sulfate) and alkaline salt (i.e. sodium bicarbonate). Temperature dependent, velocity of the finished foam, and logistical complications led to the demise of chemical foams.

The other category for foams are classified as mechanical foams, produced by the combinations of foam concentrates with water and then expanded with air from an external force. Normally considered low expansion foams (< 20:1) these foam concentrates constitute the majority of the supplies in the market today.

● Protein Foam (PF)

Developed in the 1930's the liquid concentrate consists primarily of hydrolyzed proteins in combination with iron salts. Hoof and horn meal, and hydrolyzed feather meal are examples of the materials used in protein foam concentrates. When applied to a hydrocarbon fuel surface, the foam bubbles act to exclude the air from the fuel vapours, effectively preventing the creation of a combustible mixture. The bubbles also contain water to cool the fuel and attendant hot surfaces. The foam blanket produced is generally stiff and has limitations regarding the ability to flow across the fuel surface. Discharge devices are limited to those of the aspirating type.

● Aqueous Film Forming Foam (AFFF)

Developed in the 1960's by 3M in conjunction with the Navel research Laboratory these agents are synthetically formed by combining fluorine free hydrocarbon foaming compounds with highly fluorinated surfactants. When mixed with water, this agent will

Now considered obsolete, chemical foam is produced by the reaction of a combination of an acid salt (i.e. aluminium sulfate) and alkaline salt (i.e. sodium bicarbonate). Temperature dependent, velocity of the finished foam, and logistical complications led to the demise of chemical foams.

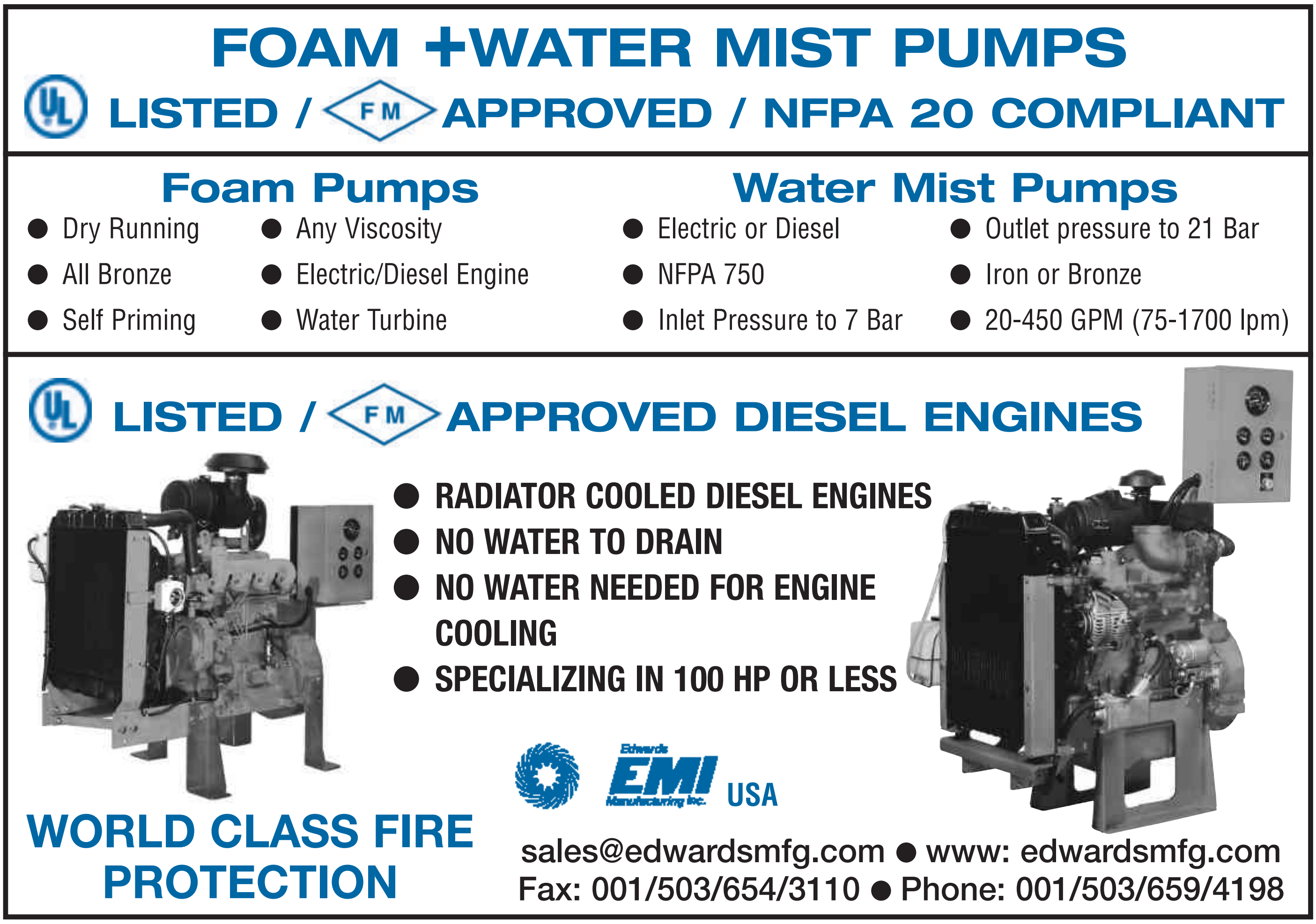
Fire Fighting Foam Concentrates and Proportioning Rates

Picture courtesy of Buckeye Fire Equipment

extinguish in the same blanketing method as the protein based foam concentrates while the resulting solution achieves the optimum surface and interfacial tension characteristics needed to produce a film that will spread across a hydrocarbon fuel. The foam produced from this agent will extinguish in the same water-cooling and vapour excluding fashion as other foams. However, the solution which results from normal drainage or foam breakdown will quickly produce an aqueous *"film"* which spreads rapidly and is highly stable on the liquid hydrocarbon fuel surface. It is this film formation characteristic which is the significant feature of AFFFs.

● Fluoroprotein (FPF)

Also developed in the 60's these agents are basically protein foams with fluorocarbon surface-active agents added. The varying degrees of performance are



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achieved by using different proportions of the base protein hydrolyzates and the fluorinated surfactants. While fluoroprotein foams generally have good fuel shedding capabilities and dry chemical compatibility, the solution that drains out from the expanded foam does not form a film on hydrocarbon fuels. However, the addition of the fluorinated surfactants may act to reduce the surface tension of the solution. This reduction may in turn decrease the viscosity of the expanded solution, thus promoting more rapid fire control when compared to protein foams.

● Alcohol Resistant Aqueous Film Forming Foam (AR/AFFF)

The 70's brought the emergence of the alcohol resistant aqueous film forming foams. Based on the AFFF structure with an added polysaccharide constituent. The finished foam has the characteristics of an AFFF when applied to hydrocarbon, however when applied to a water soluble liquid a polymeric membrane is formed protecting the blanket from the destructive nature of the water soluble fuels. AR/AFFF's normally outperform the parent AFFF when comparing burn back and foam stability.

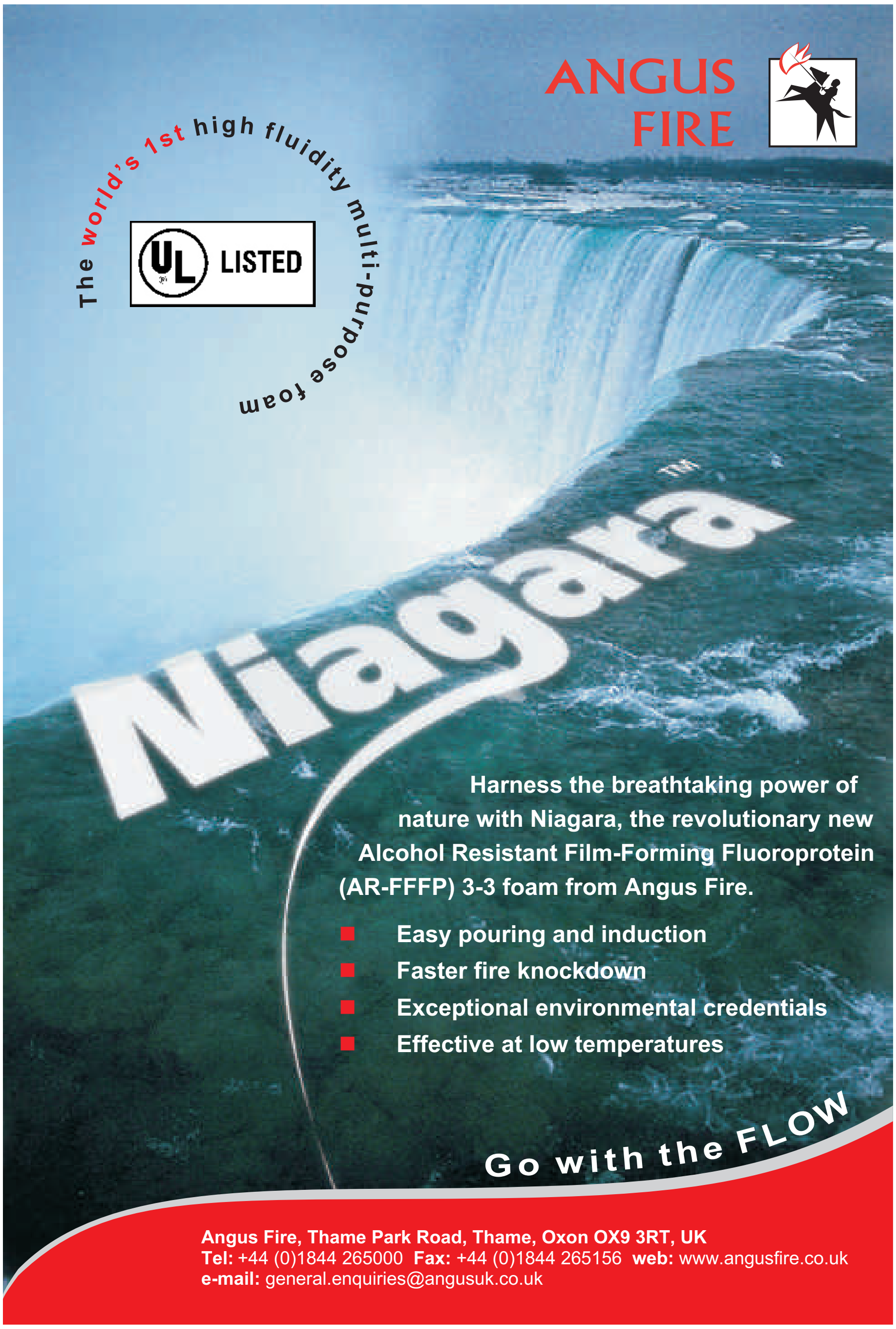
● Film Forming Fluoroprotein Foam (FFFP)

Developed in the 80's they are produced by increasing the quantity and quality of the fluorocarbon surfactants added to the protein hydrolyzate. By doing this, the surface tension of the resulting solution, which drains from the expanded foam, is reduced to the point where it *may* spread across the surface of a liquid hydrocarbon fuel. The goal of this formulation was to provide a foam concentrate that has the quick knockdown of the AFFF's and the burn back resistance of the protein based foams. As explained earlier the characteristics that make protein foam blankets stable and the characteristics that make the AFFF foam blankets quick knockdown are at opposite ends of the spectrum in regards to the solution draining properties. The result is a foam blanket that meets somewhere in the middle, a blanket that does not achieve knockdown as quick as the AFFF and does not provide the burn back resistant of the fluoroproteins.

Knockdown, extinguishment and burn back are the most sought after properties of a good foam concentrate. However several other properties should be considered including environmental impact, storage, proportioning, shelf life, viscosity, and corrosivity but it must be remembered that the main purpose for using a foam concentrate is to extinguish and suppress flammable/combustible vapours.

Proportioning:

Proportioning – Defined as the continuous introduction of foam concentrate at the recommended ratio into the water stream to form foam solution. Foam concentrate manufacturers provide products at varying degrees of actual chemical strength termed percent of concentrate. The first experimental AFFF's actually required a 25% ratio of foam concentrate to water mix. As technologies and quality of the chemical constituents increased the ratio of concentrate to water was reduced. Six, three, and one percent concentrates are examples of the foam concentrates on the market



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today. Each foam concentrate manufacturer displays the recommended proportioning rate on the container for which the concentrate was designed. Foam concentrates designed for a single fuel type (i.e. hydrocarbon fuels) have a single percentage number displayed on the container, while concentrates developed for multiple fuel types (i.e. hydrocarbons/water soluble fuels) can contain two. For the latter the required percent of concentrate to be proportioned is based on the specific fuel type.

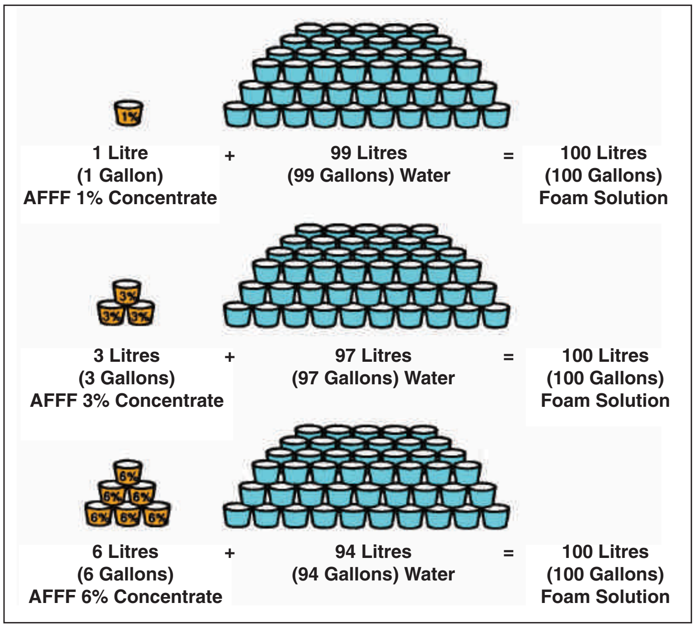

Figure 1. Courtesy of Williams Fire & Hazard Control, Inc.

It is critical that the end user follow the established proportioning rates as defined by the manufacturer. If the rate of proportioning is below that of the recommendation the water/foam stream will not contain sufficient chemical to perform properly. The lower the percentage number, the more concentrated the foam chemical. Since foam concentrate is comprised mostly of water the higher the percentage number the more water it contains.

The example above (Figure 1) indicates the ratios of various percentages of foam concentrates. Three percent concentrate basically has twice the fire fighting chemicals in the equivalent volume of concentrate compared to the six percent concentrate, one percent concentrate has three times the fire fighting chemical as three percent and six times the fire fighting chemical of the six percent. The bottom line is that the lower the percent of concentrate the less concentrate is required for a given extinguishing application.

The major advantages of using the lower percentage foam concentrates are logistical. Less foam concentrate is required for applications, system design, and warehousing. Another advantage of the lower percentage foam concentrates is economical. Price structure normally does not follow the same curve as proportioning percentage. All things being equal a six percent concentrate should cost six times less than a one percent and a three percent concentrate should cost three times less a one percent concentrate. However performance should be the primary consideration when purchasing foam concentrate because price and logistics are irrelevant if the fire does not go out.

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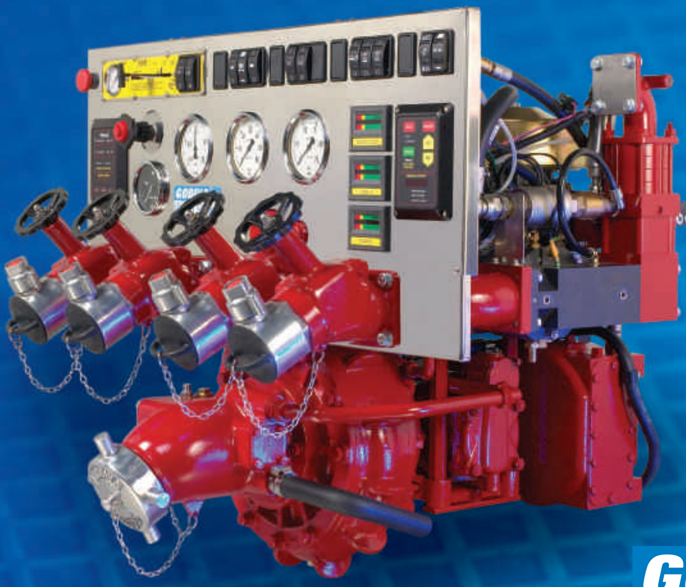

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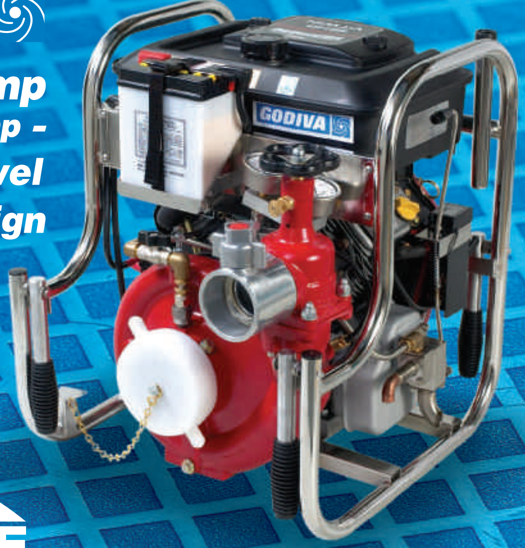

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拍火龙系统能够在现场充气；拥有独家专利的电子自我检查装置。相对传统的的钢瓶式产品，拍火龙的维护量少，而且在设计方面能提供更大的灵活性。以上几个因素，对大幅降低系统生命周期维护成本的开支，提供极大贡献。

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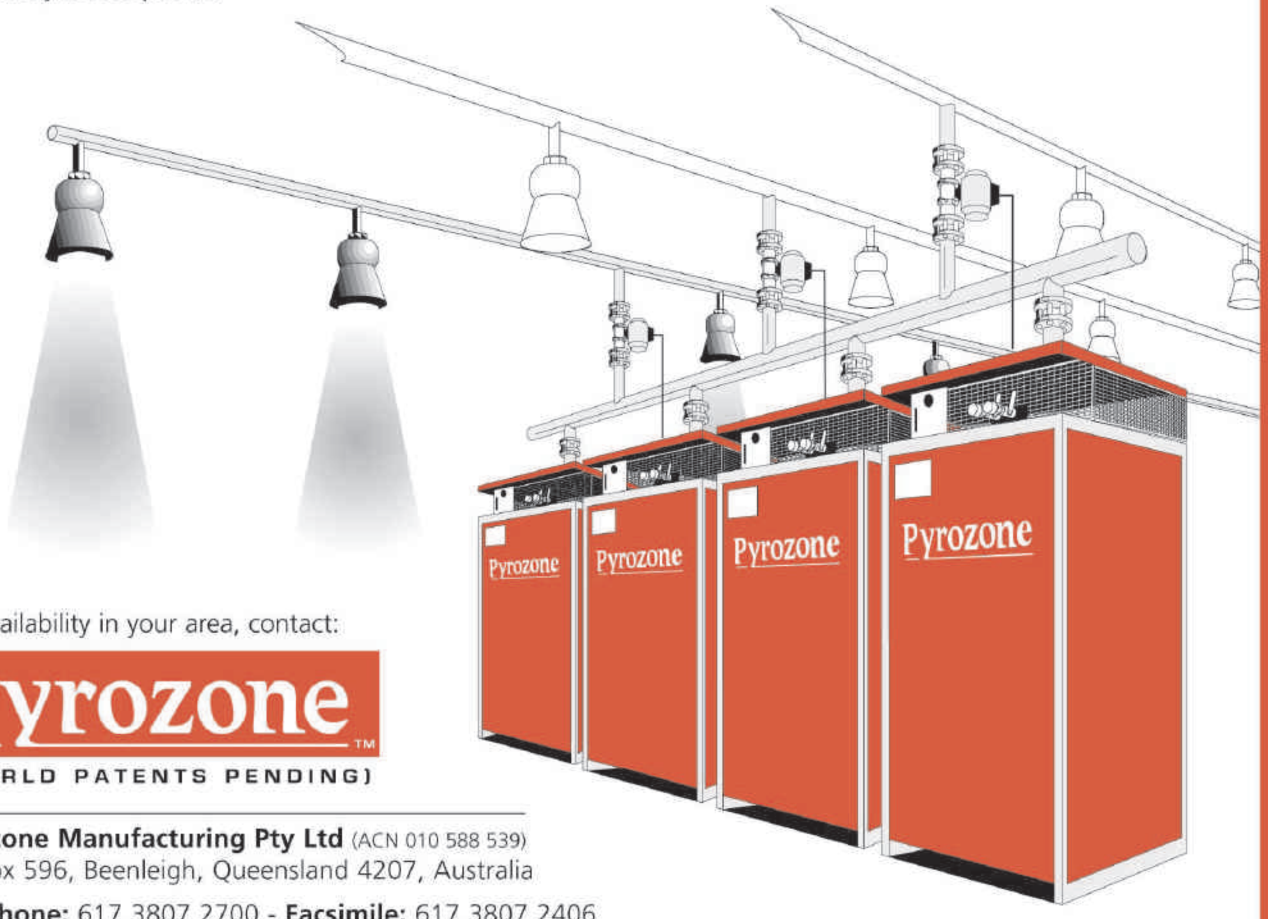

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Standards for Special Hazards Suppression Systems

By MITCH LEBOVIC, CAE

The adoption of codes and standards in the fire protection industry, as well as increased public awareness of safety practices, have resulted in substantial reductions in loss of life and property damage due to the effects of fire. When it comes to special hazards systems, two sets of standards are of global significance – those created by the International Standards Organization (ISO) and the National Fire Protection Association (NFPA).

This article will outline both ISO and NFPA standards that apply to clean agent, foam, carbon dioxide and dry and wet chemical suppression systems. For details on the standards, visit the organizations' web sites at www.iso.org and www.nfpa.org.

HALON SYSTEMS

ISO 7201-1 provides specifications for Halon 1301 and Halon 1211 installations. ISO 7201-2 provides a code of practice for safe handling and transfer procedures of Halon 1301 and 1211. In the United States, NFPA 12A is the technical standard that covers designing, installing, testing, inspecting, approving, listing, operating, maintaining, decommissioning, and removing halogenated agent extinguishing systems.

Because Halon was found to be a potential ozone depleter, there are also guidelines for proper handling and disposal of the agent. Two excellent sources of information are the Halon Alternatives Research Corporation (www.harc.org) and the Halon Users National Consortium (www.hunc.org).

HALON ALTERNATIVES

With the ban on Halon manufacture came the development of environmentally-friendly alternative clean agents. A separate set of standards applies to these agents. From ISO, standard 14520 applies to gaseous fire extinguishing systems. ISO 14520 is comprised of 14 parts. Part one covers general requirements and Parts two through 14 cover agent-specific requirements. The agents are categorized into two distinct classes, halocarbon and inert. Halocarbon agents act largely by heat absorption, although having some chemical effect on the flame combustion reactions. Inert agents contain reactive gases that act primarily by oxygen depletion.

From NFPA, standard 2001 addresses the design, installation, testing, inspection, operation, and maintenance of the new gaseous agent fire suppression systems. It also specifies components for clean agent systems, including agent supply, distribution and detection, actuation and control systems. Information and minimum requirements are included for 11 clean agents.

The most notable difference between ISO 14520 and NFPA 2001 is a change in the safety factor used in calculating the design concentration of extinguishing agents in air. Traditionally, the design concentration was 1.2 times the Cup Burner value but a more rigorous approach has been taken in that the safety factor has been increased to 1.3 times the maximum concentration required to extinguish fires.

Many years' experience has shown that a factor of 1.2 was adequate and NFPA 2001 retains a factor of 1.2 for Class A and C risks. The European Community felt that a higher factor was more appropriate for new installations. However, unless specifically required by the user, existing systems are considered perfectly adequate and do not need to be modified.

CARBON DIOXIDE

NFPA 12 provides minimum requirements for installation and maintenance of carbon dioxide extinguishing systems.

Pic: Fire Suppression Systems Association

The standard is prepared for the use and guidance of those who purchase, design, install, test, inspect, approve, list, operate or maintain carbon dioxide fire extinguishing system equipment. It covers total flooding systems, local application systems, hand hose line systems, standpipe systems, and mobile supplies.

FOAM

ISO 7203-1 provides specifications for low expansion foam concentrates for top application to water-immiscible liquids. ISO 7203-3 covers specifications for medium and high expansion foam concentrates for top application to water-immiscible liquids.

In the United States, NFPA 11 covers the characteristics of foam-producing materials used for fire protection and the requirements for the design, installation, operation, testing, and maintenance of equipment and systems. Also covered are flammable and combustible liquid hazards and local areas within buildings, and storage tanks and indoor and outdoor processing areas. NFPA 11A outlines the minimum requirements for the installation, design, operation, testing, and maintenance of medium and high expansion foam systems.

DRY AND WET CHEMICAL

ISO 7202 covers powdered fire extinguishing media. In the United States, NFPA 17 provides minimum requirements for dry chemical extinguishing systems, plus discussion of total flooding, local application, hand hose lines, and engineered and pre-engineered extinguishing systems. NFPA 17A applies to the design, installation, operation, testing, and maintenance of wet chemical extinguishing systems. It includes minimum requirements for restaurant and institutional hoods, plenums, ducts, and associated cooking appliances.

APPLICATION STANDARDS

In addition to the installation standards mentioned above, some countries have application standards as well. For example, NFPA 75 is the United States' standard for the protection of electronic computer/data processing equipment.

"If you were putting a clean agent system into a United States computer room, you would look at NFPA 75 for guidance on protecting the room

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Pic: Fire Suppression Systems Association

itself," says George Krabbe, chairman of the board of Automatic Fire Controls in South Holland, Ill. and a member of the NFPA 75 committee. "Then, you would look at NFPA 2001 which is the clean agent standard. You would also have to look at the NFPA 72 series for detection standards."

Krabbe adds that an application standard such as NFPA 75 rarely requires a specific type of fire protection. It simply outlines available options and references appropriate installation standards.

Beyond application standards, Krabbe says that local electrical and building codes must be followed. In many cases, those local codes refer back to national standards. But, in cases where they don't, it's always the more stringent code that must be followed.

DETECTION STANDARDS

As Krabbe mentioned, anyone installing a special hazards system will also need to be informed of standards relating to fire detection. ISO 7240 is the international standard on fire detection and alarm systems.

NFPA 72, also known as the National Fire Alarm Code, deals with the application, installation, performance, and maintenance of protective signaling systems and their components. This is a comprehensive guide to the design, installation, maintenance, testing, and use of fire alarm system. In the United States, designers, installers, authorities having jurisdiction and maintenance personnel depend on the Code as a source for safety guidelines, up-to-date technology and industry practices.

GLOBAL STANDARDS

There are many standard-making bodies beyond ISO and NFPA. In many cases, the standards adopted by these organizations mirror the ISO standards. In other cases, the standards are unique. Wherever you install a special hazards system, check with both national and local governments to determine applicable codes and standards. Here are a few national organizations that produce fire protection standards.

Europe

Great Britain
British Standards Institute
www.bsi-global.com

France
Association Francaise de Normalization
www.afnor.fr

Germany
VdS Schadenverhutung
www.vds.de

Norway
Det Norske Veritas
www.dnv.com

Australia

Fire Protection Association of Australia
www.fpaa.com.au

SSL Australia
www.sslaustralia.com.au

Asia

China
Tenjuin Fire Institute

Korea
Korean Fire Equipment Inspection Corporation

Hong Kong
HK Fire Services
www.info.gov.hk/hkfsd

Malaysia
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www.bomba.gov.my

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An Insight into the Fire Truck scene in Asia

Refurbished and repowered FMC in Manila.

In considering Asia, it is important to realise that in this context, we are talking about more than 50% of the world's population. That means that in terms of market potential for truck manufacturers it seems huge. But the Municipal Fire Services in Asia are as diverse and individual as people.

Some countries carry the legacy of former colonial powers, albeit modified to suit the current needs of operations and financial necessities. Many of the countries have either gone towards Japanese or American style, with midship pumps and a very basic design, carry a relatively large amount of hose and on average 4,000 litres of water with mostly 2,500 litres per min (lpm) low performance pumps.

However, in recent years, some brigades are trying to put their own concepts into operation.

Singapore Civil Defence, for example, has developed with a local bodybuilder, what has been called "The Red Rhino"; a comparably small 4x4 mobile pump concept, which uses hydrant feed, and has no tank for first attack, it has an open body concept to allow fast deployment and since the travelling distance is short, a fully protected crew is not a necessity for the brigade.

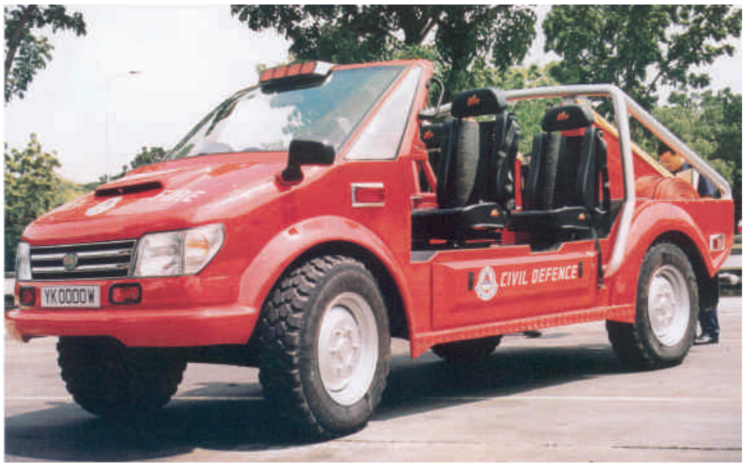
The design was necessitated by the modernistic space usage of the Singapore's urban areas, where space is a premium, resulting in insufficient road width which makes the deployment a full size pumper on site a challenging feat. Moreover with one or two badly parked cars, disaster is sure to ensue.

Brunei in earlier days suffered with water shortages in places, and so developed 10,000 litre pumpers. This enabled them to be able to be used for the many grass fires that occur along the highways, but moreover the crew had more chance to control the fire in the villages, where many of the houses were made of wood.

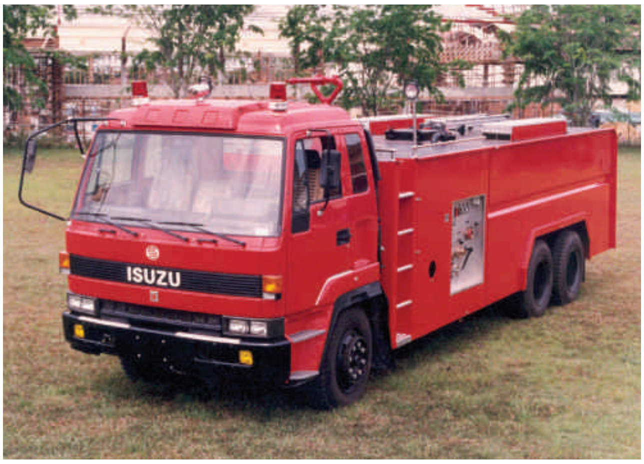
Before this large pumper was in use, the problem occurred that by the time the water had been found, the property had been razed, due in many cases to wooden construction.

Some of the more populous countries have the problems of "shantytowns", where if there is one fire, because of the close proximity and wooden structures, most of the area will be razed.

It is almost impossible to penetrate these areas.



Red Rhino.



10,000 litre pumper – Isuzu Chassis – Taiwan.

One of the biggest problems that the brigade faced was the traffic, because of the "must stop and see" attitude, a jam of huge proportions occurred, resulting that the appliances could not get to the scene easily.

Having eventually reached the scene, there then comes the problem of water. In most of these areas, there is little or no water, and so it has to be tanked in, and this is exacerbated by the "onlooker" traffic.

It therefore becomes apparent that these brigades need to develop their own strategies to combat these problems, hence the use of UHPS (ultra high pressure systems) whereby little water can make extinguishment a possibility, even if it means using a pickup truck to carry the unit into the area.

Singapore has developed its own UHPS and uses it for the housing blocks, to prevent water damage in the government built flats.

I was asked if I could rebuild it.

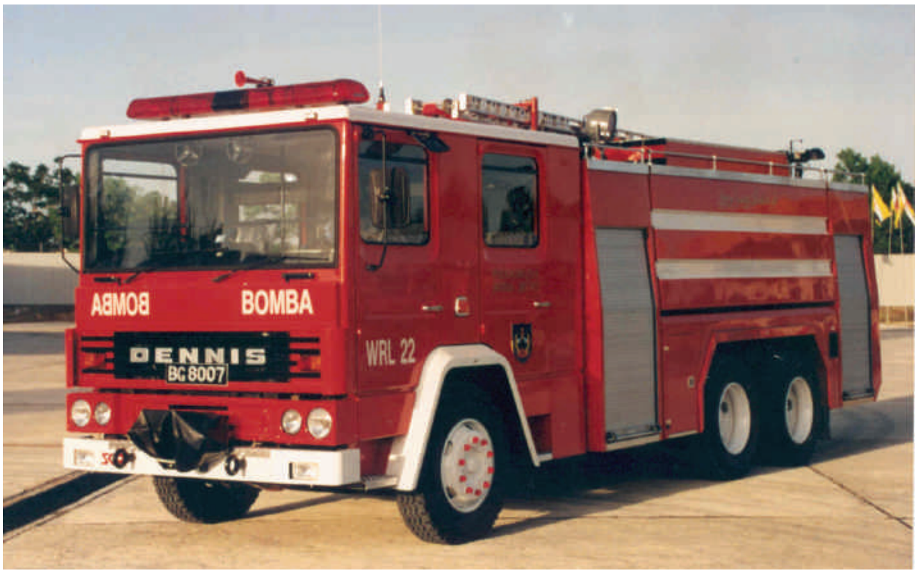
Hong Kong has also used the ATV to get around the narrow roads on their islands to carry a fireman and some basic equipment and pump.

Its interesting to see sometimes, some of the manufacturers from Industrialised countries who can't understand why things are done the way they are and not the way that they think they should be done.

If you look at reality, nearly every nation that has a sizable community in Asia and any sort of body manufacturing industry make their own fire trucks.

Many have import restrictions and tariff barriers to ensure that they use homegrown products.

Furthermore, many of these countries are looking to increase their exports and are actively seeking cross border activities to augment national balance of payments.



Dennis Thunderbird 10,000 WRL – Brunei.

Active in this category are Indonesia, Korea, Southern China, Thailand and Malaysia, as well as Singapore.

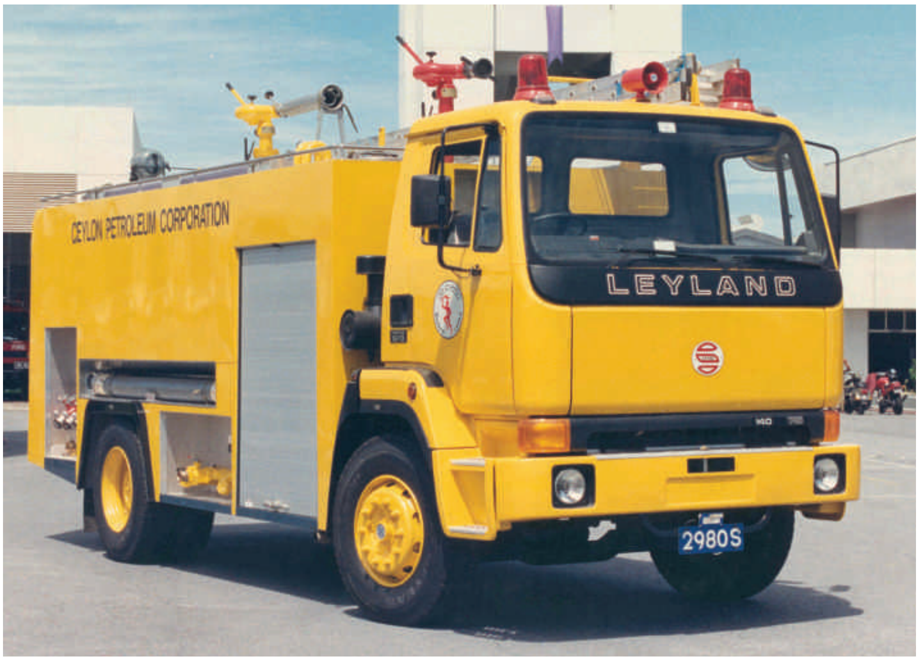
Some of the countries have a political will to change and progress to more modernistic practices and equipment. On the other hand, places such as Myanmar just can't afford to go to highly sophisticated equipment and the incumbent maintenance difficulties involved.

Many brigades have limited facilities for repair and maintenance; due in some cases to lack of funds and technologically advanced technicians. Therefore, basic mechanical equipment is the easiest thing when it comes to repairs.

For example in Dhaka, there are many very good mechanics and due to the shortage of funds, they still operate Bedford chassis, which are some 20 or more years old. The mechanics can manage these very well, but what would happen if they suddenly got a shiny new electronically controlled Scania or Actros? There will be a real maintenance problem. Laptops and such diagnostic facilities are still not in place and it will be a long time before the ability to cope with these products will be available.

That is why the Japanese chassis manufacturers are so successful in these markets, the chassis' are simple and in most countries, spares are available with ease.

However, the ready availability of chassis' has led in many of the poorer countries to the "total package" of the Japanese style pumper, mainly built by the bigger Fire Truck manufacturers.



Ceylon Petroleum prefer simple designs.

Mini Pumper on KIA Chassis – Philippines.

Simplicity the order of the day.

They are cheap, basic and easy to maintain. So in many cases it is difficult to understand why they should buy anything more sophisticated and expensive.

Not only that, but since the technology is so simple, many other countries now copy the concept. For example, Thailand has local production of the Japanese chassis' and therefore local copies of the body style for domestic consumption as well for export into regional low cost countries, where there is no current production.

These markets are not the place for the big boys in Europe and the US and I really don't think that they will ever understand the minds and logic of these brigades, where they would rather have 3 of these units than 1 sophisticated truck, which will be knocked dented and abused until it looks a wreck in 5 years time and people will say, how much did it cost us?

But these markets are not all about pumpers, although in most cases this is the priority for the majority of brigades, along with support vehicles in the form of tankers, pickups and portable pumps.

New developments are making it essential that equipment should at least start to move towards newer hazards. Many brigades now are looking into HAZMAT and Emergency Scene Control, utilizing better detection and protection, but training still needs to be investigated further.

Hong Kong, Taiwan and Singapore are the leaders at trying new things. This gives them the opportunity to give the taxpayer a return on his money. He wants to see the efficiency of dealing with the disaster on his doorstep with the money the government has spent.

The introduction for many years of the Combined Ladder Platform (CPL) has transformed the aerial market. The TTL is no longer dominating the scene and with limited space, the money in many cases the use of the CPL will optimise usage.

It is therefore essential that manufacturers address these issues and make products that are "best value for money" so that governments can get the most out of limited resources for the protection of their public.

Simplicity, ease of operation, as well as understanding the customer's needs are the most essential requisites for companies doing business in these areas.

It is also important to bear in mind the stature of the fireman, usually shorter and not so broad, these guys are fast and efficient, but reaching for equipment stowed at high level makes for a risk of injury in operation. Being "on site" can also help suppliers understand other small issues that may be present, like for instance where I have been involved in the supply of trucks to a very large petrochemical complex with different operators in up and downstream processing. In this case, a separate construction company had built each section for different owners.

Subsequently, within 6 different installations it was possible to find BSS, NST, Stortz and Machino couplings. Can you imagine the number of adapters that were needed???

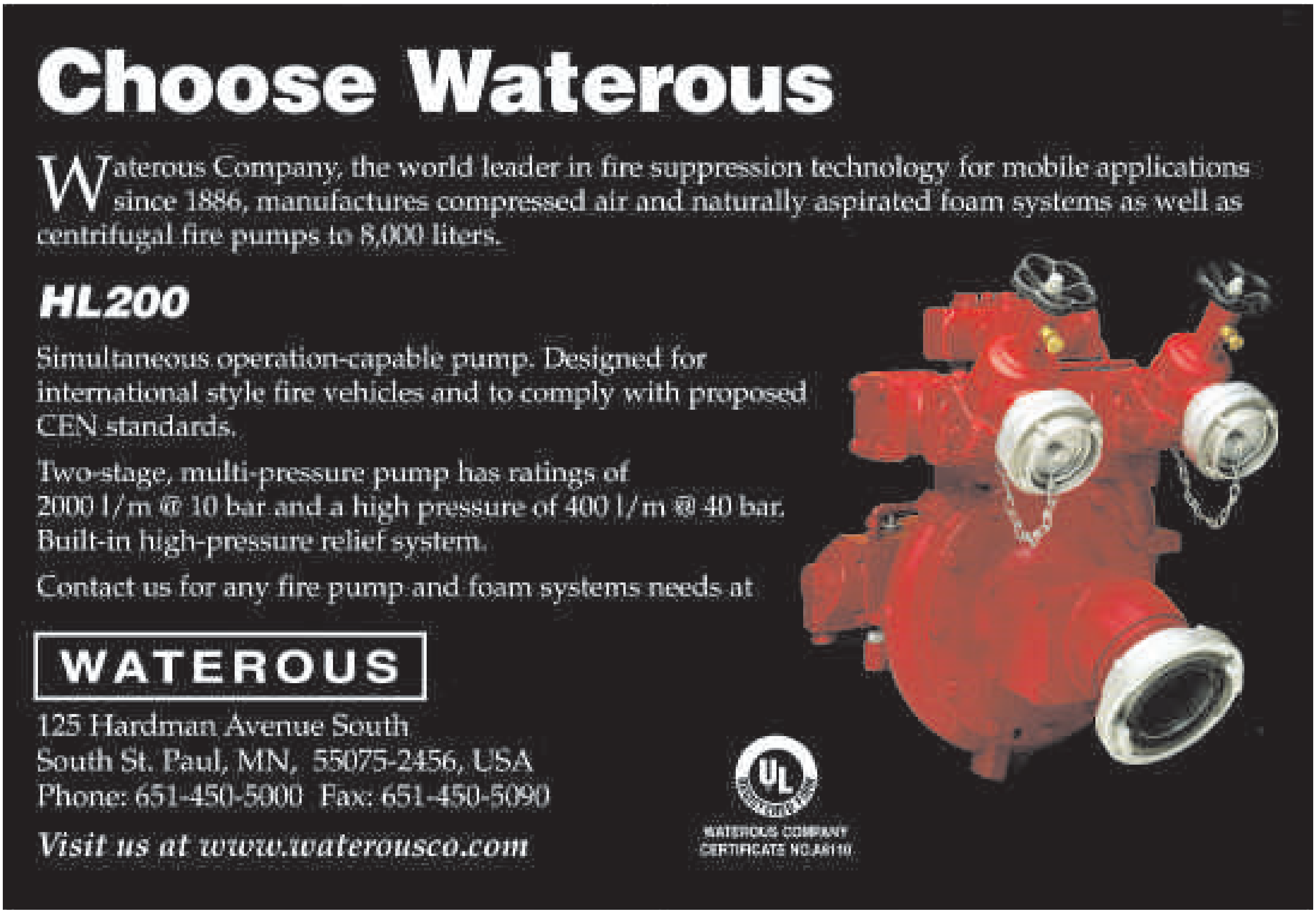
In overall consideration for the fire truck industry in Asia, simplicity is still the order of the day. The ability to physically turn a valve rather than push buttons is still preferred and of course this also makes maintenance easier as well.

The truck will endure, in some cases, a tough life; so easy body repairs are also essential. Therefore steel and aluminium are ideal body construction methods.

Availability of spares and back up service for the basic chassis' are essential. It makes no sense to offer a chassis to a country if there is no ability to offer spares and a basic back up service.

Understanding the customer, his needs and aspirations is essential and that means visiting and really seeing the constraints and problems that can be faced. The ability to take modernisation in some of these countries needs careful planning, and "one step at a time".

The opening of China under the WTO agreement also needs to be addressed at this time and although it seems to be a vast opportunity, those with experience will tell you to "tread carefully". China has a big fire truck industry and the products are in many cases well made and work well. Expertise from world manufacturers has been taken in many years ago and so the potential may have the opposite effect. Then we will see many exports from this relatively low cost area in the Asian markets.



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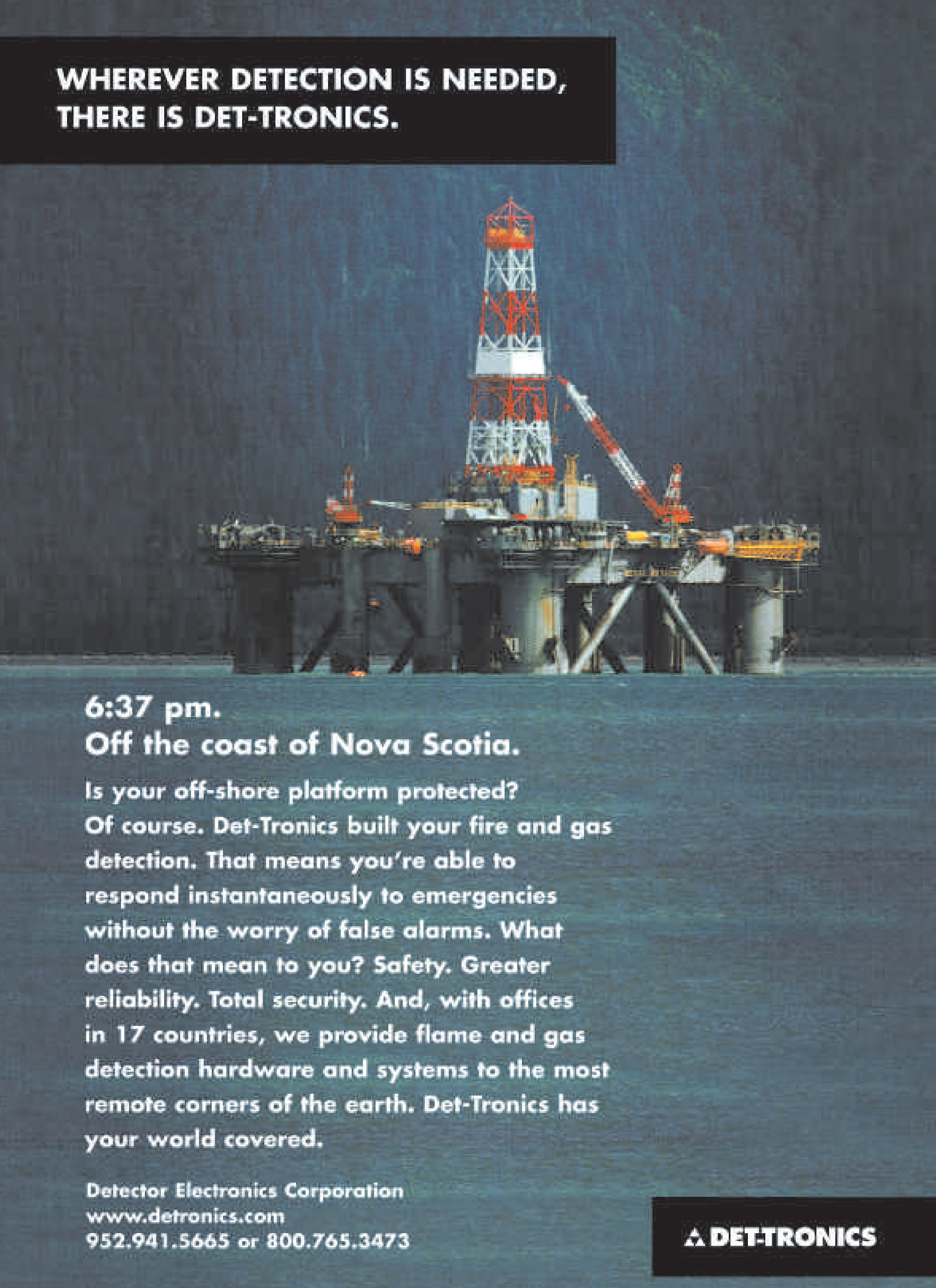

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Flame and Gas Detection Systems

By **Randy Durick**
Detector Electronics Corporation

Selecting the best fire and gas detection system depends on your needs, your application, as well as the local authority having jurisdiction (AHJ). All of these parameters, along with a safety assessment need to be considered before proceeding, as any system that is designed and installed will need to meet local regulatory guidelines.

In most European Market; Electromagnetic compatibility (EMC), ATEX, and the low voltage directives, along with applicable IEC standards govern flame and gas detection equipment. In the United States, the National Fire Protection Association (NFPA) codes regulate the design and installation of fire and gas detection systems, along with the applicable ANSI standards. Other markets have adopted these standards or developed their own. In short, regulation has leveled the playing field.

Once the regulatory questions have been answered, the next important subject will be cost of ownership. When comparing equipment, a simplistic view would be to compare purchase prices. This methodology, however, may not represent a true comparison between the equipment being considered. Criteria that should be evaluated are purchase price, ease of installation, maintenance requirements, architecture, and system life span. It is necessary, then, to do a true feature/benefit analysis on the equipment under consideration.

During the evaluation of a fire and gas detection system, the field device technology must be considered. When selecting combustible gas detection, Optical detectors for combustible gas detection provide an increasingly popular alternative to traditional pellistor-based combustible gas detectors. One reason for their popularity is the ease of implementation in Safety Instrumented Systems (SIS) intended for high availability and Safety Integrity Levels (SIL).

WHY INFRARED GAS DETECTORS?

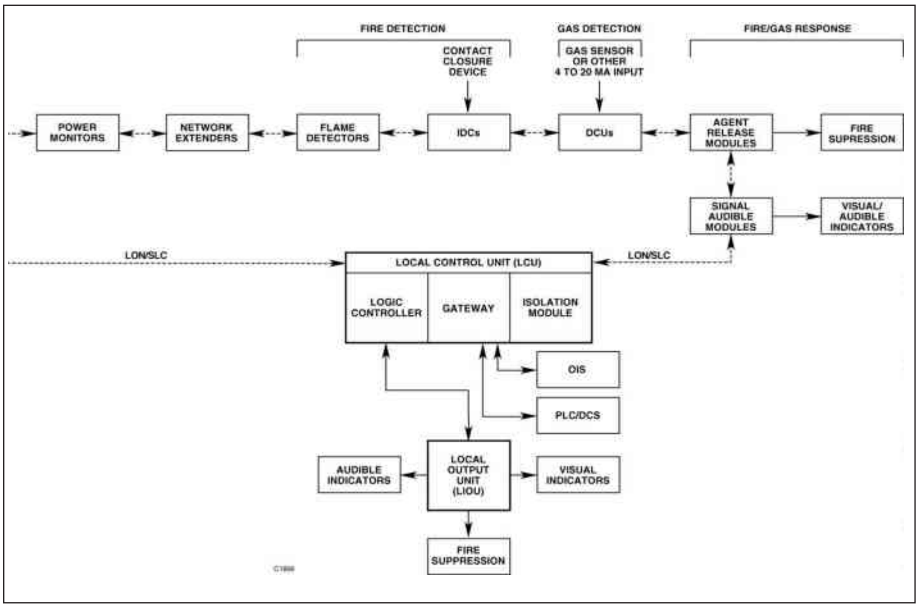
The historical method of detecting combustible gases involved sensors based on pellistor beads. Pellistor based sensors are susceptible to significant covert (undetected) sources of failure which extend the MTTR. Primary of these are catalyst poisoning and flame arrestor plugging, either of which prevent the sensing of gas. In the example below, it is easy to see how a covert pellistor failure could remain undetected for much longer than 10 hours as the only way to detect a failure is to periodically check with gas.

The absence of covert failure modes is the intrinsic characteristic of infrared gas detectors that provides a significant advantage over catalytic beads. All failure modes are overt and instantly signalled so that repair can be initiated immediately.

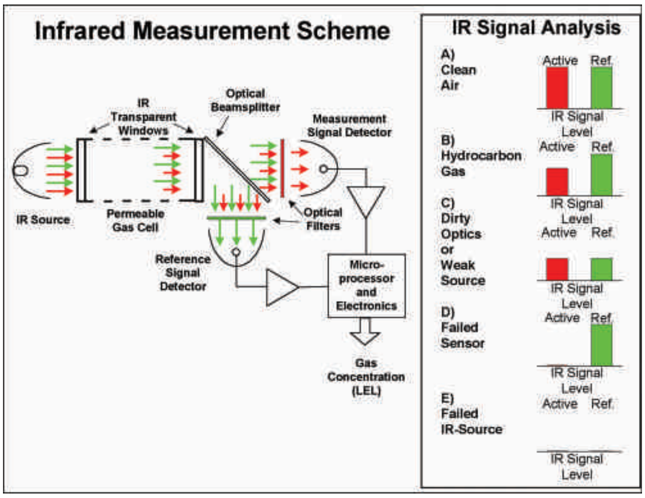
All infrared gas detectors use variations on the basic measurement scheme outlined in the illustration. In this scheme, there is an infrared source that illuminates a volume of gas that has diffused into the measurement chamber. The gas absorbs certain of the infrared wavelengths as the light passes through it whilst others pass through completely unattenuated. The amount of absorption is related to the concentration of the gas.

The amount of absorption is measured by a set of optical detectors and subsequent electronics. The change in intensity of the absorbed light is measured relative to the intensity of light at a non-absorbed wavelength. The microprocessor computes and reports the gas concentration from the absorption.

The signals from the IR detectors are interpreted as shown in the illustration.



Picture courtesy of Detector Electronics Corporation



Courtesy of Detector Electronics Corporation

Panel A and B illustrates the normal state of operation of the detector. When there is no gas present the signals for the reference and active channel sensors are balanced. When there is combustible gas present, there is a predictable drop in the output from active channel sensor because the gas is absorbing light.

A fault condition is illustrated in panel C for the signal levels encountered in the case of dirty optics or a weak and failing light source. The former scenario is a trigger to perform routine maintenance and the latter is an indicator that preventive maintenance should be scheduled. In either case, the instrument continues to faithfully measure gas concentration up until the situation degrades to an untenably low signal level. These maintenance situations are easily flagged with modern digital field communication and any number of asset management and predictive maintenance programs.

Panel D and E illustrate the situation with failed components in the measurement loop. If a sensor fails or light source fails, signals on one or both sensor channels will fall to zero.

The achievement of high availability in an instrumented safety system is critically dependent upon the mean time to repair (MTTR) in the event of a failure of system components. Optical IR detectors for combustible gases have intrinsically low MTTRs because there are no covert sources of failure thus minimising the amount of time between an instrument failure and the time that it is detected.

OPTICAL FLAME DETECTION

When considering optical flame detection, several technologies exist to choose from, depending on the application. Optical flame detectors are important components in all modern, industrial facility fire protection systems. The primary function of these systems is to alert the occupants of the facility, initiate automatic control action to prevent a potential catastrophe, and activate automatic fire suppression and extinguishing systems to control an unwanted fire. An important consideration in fire detection system design is to identify the sensitivity and response time required to detect and suppress a fire or explosion before extensive damage occurs. Current optical flame detection technologies utilize the electromagnetic spectrum (see figure) to detect fire by using various combinations of the spectrum. The newest optical technology employs a CCD array as the sensor input.

ULTRAVIOLET

Ultraviolet detectors provide reliable detection to virtually all fires, and until recently were the only option for detection of non-carbon fires. However, they are sensitive to radiation from welding, lightning, X-rays, and other nuclear sources. Advancements in UV detection false alarm rejection came with the introduction of advanced signal processing algorithms. In general, UV detectors operate by counting the electron discharge from each UV photon.

INFRARED

Infrared detectors provide reliable detection of carbon-based fires. They offer

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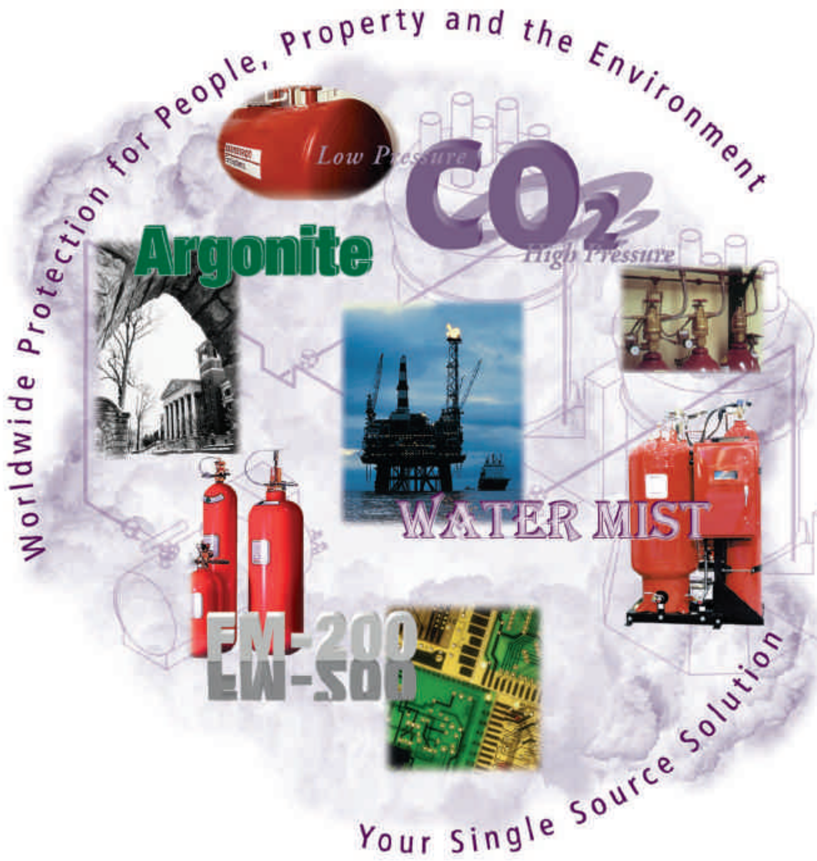
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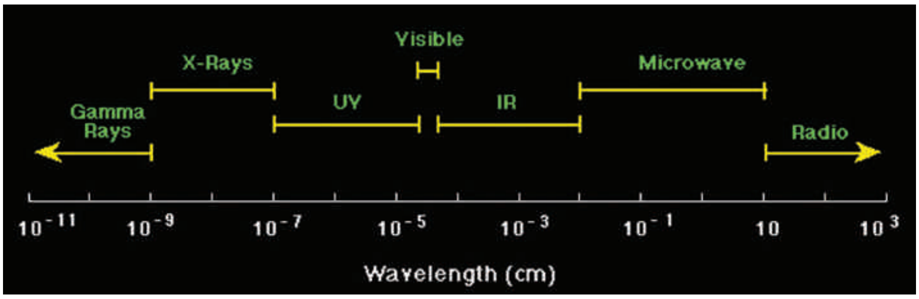


Courtesy of Detector Electronics Corporation

high resistance to blinding from airborne contaminants or attenuators. Recent advancements in signal processing have allowed this technology to evolve into a solid performing technology in a wide variety of applications. In general, IR detectors are centered on the CO_2 emission peak. The detector will look for an identified IR source to meet several criteria including intensity to qualify the IR source as a fire.

ULTRAVIOLET/INFRARED

UV/IR detectors provide reliable detection of carbon-based fires only. By combining the detection technology of UV and IR, this detection technology is very reliable without succumbing to the nuisance of false alarm sources. Once again, advancements in signal processing have allowed extensions to the feature sets of these detectors.

MULTISPECTRUM INFRARED

Multispectrum Infrared detectors have the ideal combination of flame sensitivity and false alarm rejection. In recent years, the introduction of multiple wavelength flame detectors has resulted in increased flame sensitivity and improved false alarm rejection. By employing multiple sensors at different wavelengths and sophisticated signal processing algorithms, the detection range of these devices is typically 50% greater than the other technologies, all without sacrificing false alarm immunity.

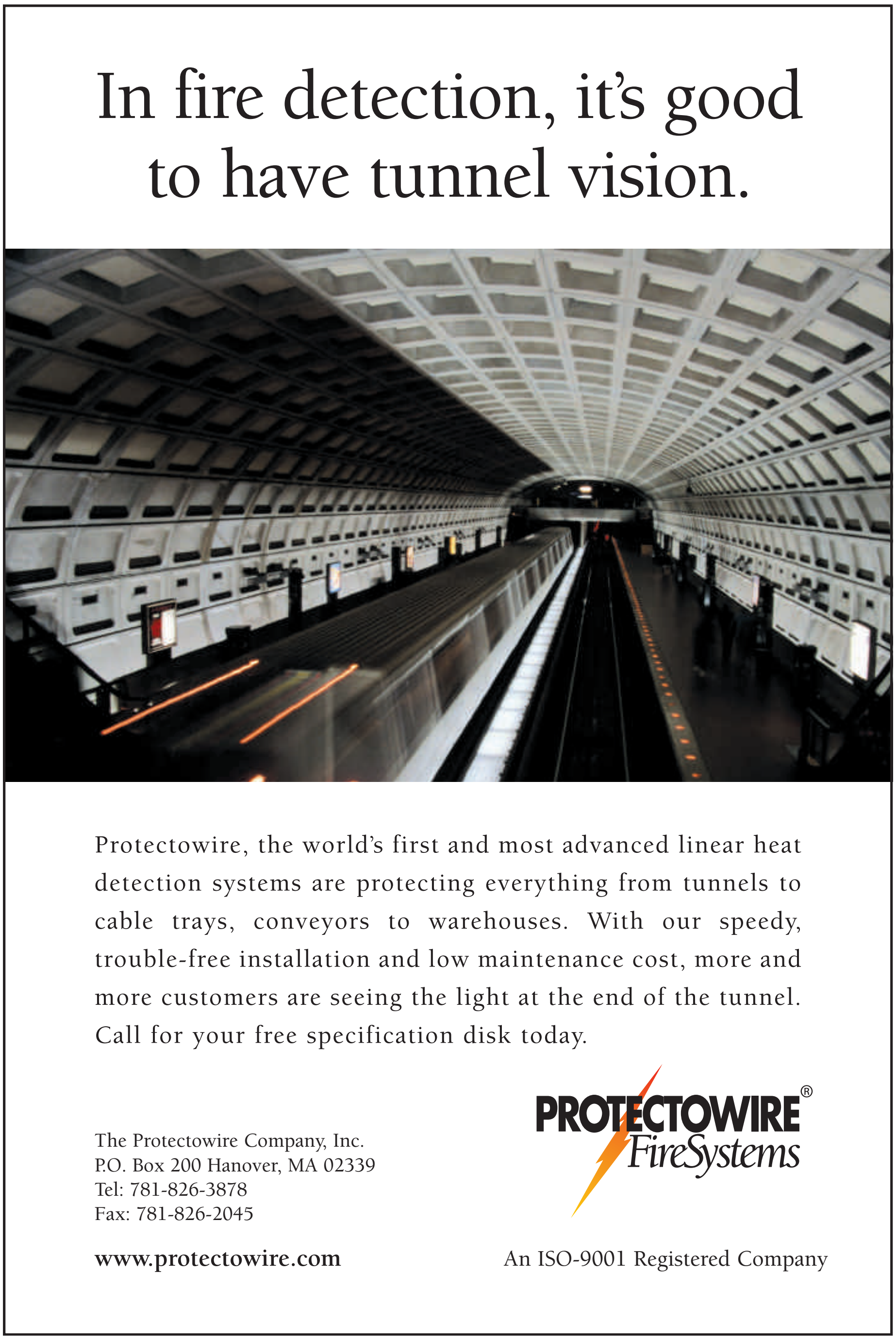
CCD-BASED FLAME IMAGING

As the fire protection industry continues to evolve, industrial fire management becomes more complex. Current optical flame detection technologies utilize the electromagnetic spectrum to detect fire by using various signals in the Infrared region or the Ultraviolet region of the electromagnetic spectrum. The newest technology combines video imaging and advanced software algorithms to provide the highest level of optical flame detection performance while supplying a parallel viewable image for hazard mitigation, operator response, or post hazard event analysis.

SUMMARY

Traditional applications typically separate the flame detection/suppression system from the gas monitoring system. Architectures are now available that allow a fire detection and extinguishing agent release system to be combined with a hazardous gas monitoring system. The combination of these functions is possible when deployed on a fault tolerant digital communication network. These systems utilize an advanced architecture (Figure) that is equally adept at monitoring analog process signals from combustible and/or toxic gas detectors as well as discrete 'contact closure' type devices such as manual fire alarm call points, heat detectors, smoke detectors, and optical flame detectors. The sensor information is then transmitted to the control unit to execute the fire suppression logic, to control agent release, signaling, and annunciation outputs, and to communicate with external operator interface systems for configuration and monitoring.

Randy has over 5 years experience in the process control and safety industry. He is currently employed as the Manager or Worldwide Marketing at Detector Electronics Corp. in Minneapolis, MN, USA. Randy holds degrees in Engineering Science from Pacific Lutheran University and Chemical Engineering from the University of Wyoming.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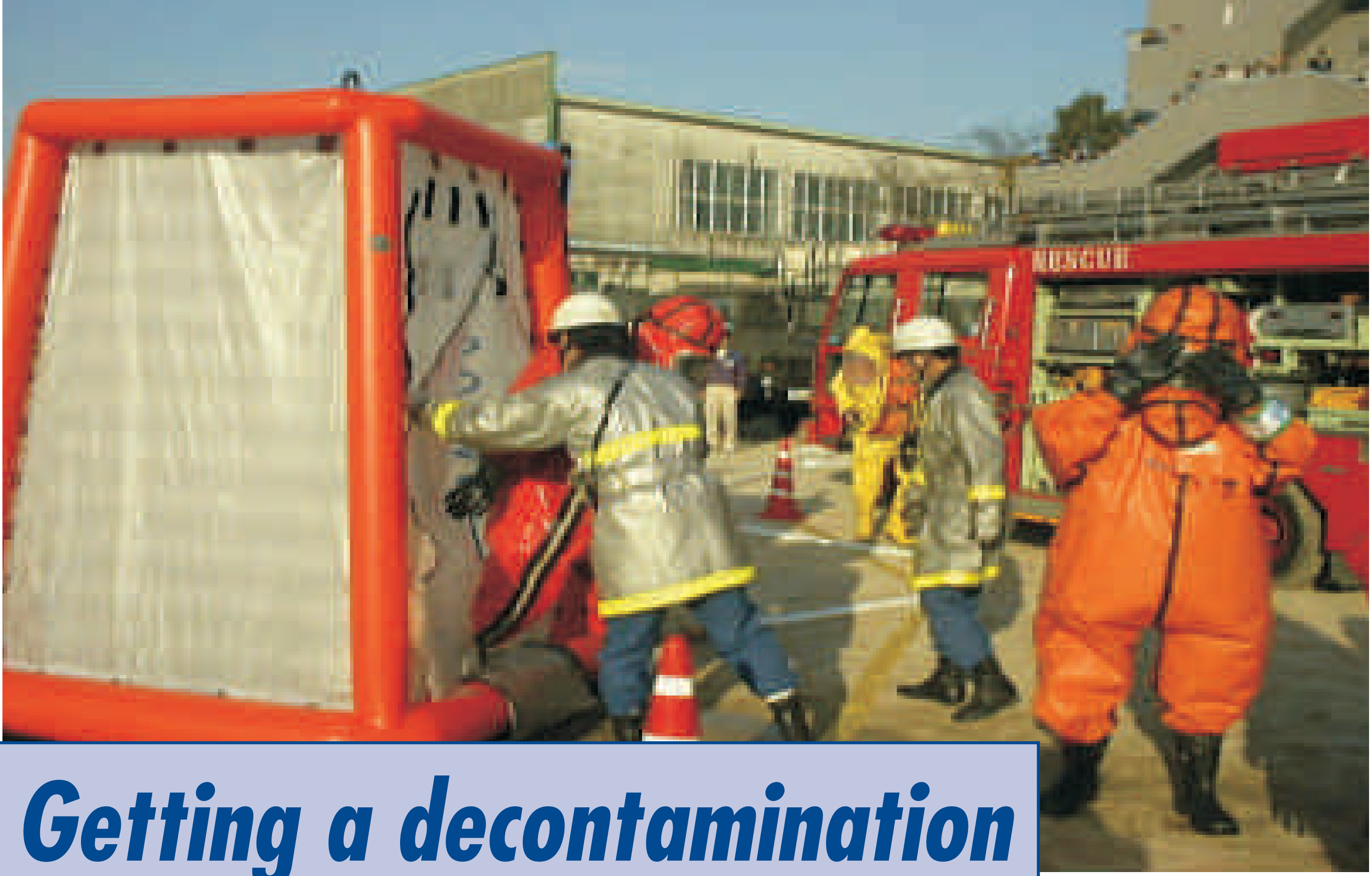

Picture courtesy of Plysu Protection Systems

Getting a decontamination policy in place is no longer an optional extra

It will be said that the events of September 11th in the USA brought into sharp relief the urgent need to review the current provisions for terrorist response by emergency services in general, and for decontamination procedures in particular, wherever in the world they were located. The truth is that the real wake-up call was sounded in 1995, when the use of Sarin by terrorists in Tokyo resulted in 12 deaths and 5,000 casualties. Whilst September 11th demonstrated in a hideously vivid way the egg shell fragility of our civil society I would suggest that it was the Sarin attack in Tokyo that must be regarded as the most likely model of the shape of terrorist attacks to come. Even if the war on terrorism concludes gloriously everywhere the need for all national emergency services to have a decontamination policy in place will not have gone away by any means.

This is because although the terrorist threat is, as we all now know, very real an industrial accident or an RTA are more likely to be the cause of chemical casualties and contamination. This threat will continue to grow as economic globalisation goes on apace, and every day more and more toxic material of every kind is being moved around the earth in ever increasing quantities. However strictly these movements are controlled and monitored, however well managed, the possibility of human error will always be there. Because of this every emergency service should have a decontamination policy in place based on the latest technology as part of its core activity. It can no longer be regarded as an optional extra.

The response of the authorities in the different Asia-Pacific countries, as elsewhere, to the challenge posed by the threat of serious decontamination faced by both emergency service personnel and civilians, is varied. Some countries, like Japan, have taken on board the latest decontamination technology, which since 1995, has been developed to address these new challenges. They are also developing drills and procedures to operate it successfully. Others, on the other hand, have done very little and where they have, far too many national agencies have framed their proposed response to a decontamination situation on thinking derived from the military. The problem is that battlefield situations do not translate into the operational realities of civilian emergency services. For a start the military use water for the decontamination of vehicles only, and are trained to fight on in state of the art protection equipment regardless of levels of contamination. The civilian

> *The problem is that battlefield situations do not translate into the operational realities of civilian emergency services.*

Picture courtesy of Plysu Protection Systems

services have different priorities. The survival and the decontamination of casualties being paramount. They also have to be concerned with compliance with their own national guidance documents, if any, Human Rights legislation and whatever Health and Safety regulations apply locally. The very fact that a civilian wears PPE and the military wear IPE (individual protective equipment) says it all. The inadequacy of relying on a military prescription is unfortunately often only revealed when a Hazmat incident occurs.

This is completely unnecessary as the new technologies and procedures developed since 1995, now well tried and tested, can be put in place with relatively little expense in terms of money or time. There are even companies that specialise in providing risk management information systems for use in the civil emergency response environment, the most notable being Bruhn New Tech Central to all the new thinking on the subject is the need, if casualties are to be kept to a minimum, for a swift response and contamination containment. This means avoiding cross contamination of personnel, and the contamination of ambulances and the hospital environment. To do this successfully it is essential that training be given in assessing the damage potential of an incident. To the best of my knowledge, however, there are few training programmes extant in any part of the world that really focus on this vital subject.

Three of the most important factors in making such an assessment are the type of agent, the quantity released and the weather conditions prevailing, particularly wind speed and direction. This will determine not only the sitting of decontamination equipment but the positioning of the Incident Control Point, where the "clean" and "dirty" areas are going to be located, the approach to the point of release and how the operation is to be zoned to ensure the proper management of the incident. At the epicentre is the Hot Zone, with entry and exit points strictly controlled. This leads into a Warm Zone for casualty decontamination, which leads into a Cold Zone where casualties are treated before crossing a Clean Line. Because prior warning of a terrorist attack is not always given and, in the case an accident, there is no warning at all, thorough training is absolutely essential for all emergency service personnel involved in decontamination incidents. Where seconds lost in treatment can mean the difference between life and death it is essential that drills and procedures must be choreographed to perfection. In Europe and the USA in particular, this process has been further stimulated by an increasingly litigious culture and managers of rescue services have been very active in promoting co-operation between the public sector and manufacturers in the development of suitable equipment. However cash strapped fire services and healthcare agencies may be, there is recognition that non-availability of funds for scene of incident decontamination and training in procedures will be no excuse in law in the event of trouble.

For this reason alone there must be a complete familiarity with the decontamination technology to be employed. In recent years this has evolved exponentially in Europe. Not initially, it has to be said, as a response to an increased risk of terrorist or HAZMAT incident, but due to environmental considerations. Some 15 years ago high flow rate; open decontamination showers delivering up to 2000 ltr/pm were designed for Hazmat situations. This was in response to the then generally received wisdom that if diluted more than 1000 times during the post clean-up phase of dealing with contaminated PPE the contaminant might be allowed to pass into watercourses and the environment generally. This thinking has been long outdated and now best practice demands that contaminant has to be contained and be disposed of by specialists. At the same time we live in the real world and officers in charge of an operation are empowered to take the best environmental option that is available.

> *There are companies that specialise in providing risk management information systems for use in the civil emergency response environment.*

All of the factors discussed so far culminated in the present evolutionary leap that has been taken by decontamination technology in recent years. My company did some radical rethinking about the type of equipment needed, prompted as much by the new environmental disciplines` as by the Tokyo

Getting a decontamination policy in place is no longer an optional extra

Sarin attack. The specification we set ourselves to meet was formidable. It required fully integral, portable units, complete with shower equipment, that not only had small storage footprints but that also contained all contaminant with features such as detergent injection for decontamination enhancement. All this had to be capable of being deployed in two or three minutes.

Historically purpose-made portable decontamination systems have not been used by ambulance services and hospitals. This was because for many years the threat of contamination from an incident was not deemed to be very significant. The result was that victim decontamination was limited to crude but readily available bucket and brush and hosing down techniques.

It is pretty obvious that the treatment of victims of a remote chemical spillage incident demands that they should have access to a purpose built portable shower unit as swiftly as possible. This improves the chances of survival and will greatly reduce the need to decontaminate equipment, vehicles and hospital emergency staff.

Picture courtesy of Plysu Protection Systems

By integrating decontamination technology with an inflatable processing booth units have been created which can be stored and carried in small holdalls and yet be fully deployed, in some cases, within two minutes. Importantly this new technology was not created or evolved in a vacuum but in close conjunction with emergency services. Also, before its launch, it was tested extensively at the various regional emergency service exercises throughout the UK to simulate response to Hazmat and terrorist incidents. Currently we have units in service all over the world including in the USA, Japan, Hong Kong, Taiwan, Malaysia as well as Europe.

One of the features of this new technology is that great emphasis has been placed in its design on ensuring that it is cost effective and low maintenance. Its design also allows for easy repair and a long service life. For example in the event of damage to such a unit the ability to dismantle the shower into two or three components, only one of which may require repair or replacement, will contribute significantly to cost savings. Exclusive to PPS products are disposable liners, which also prolong the working life of the unit and prevent the need for it to have to be decontaminated after use.

The modern portable decontamination shower incorporates a number of other important features. All contami-

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nated liquid is, for instance, collected within the shower unit for transfer to appropriate waste containers for disposal. All inflatable casualty systems for ambulance services and hospitals need to be large enough to accept one or two wheeled stretchers, with the ability for medical staff in PPE to work closely either side of the casualty, or for several ambulant casualties.

Efficient economic decontamination is also essential. Modern Hazmat decontamination showers can achieve low flow rates of 30-40 ltr/pm, with wide-angle mist sprays to ensure complete penetration of all folds and overlaps in the case of PPE decon. Decontamination can be further enhanced using a brush agitator and suitable detergents discharged through the shower systems before rinsing off the PPE. Casualty units require a more controlled, directional and gentler water flow of typically 10ltr/min, which can be achieved using valve operated hand-held spray heads. Enhanced decontamination might be effected using an appropriate detergent with sponges or light brushes.

Inflatable systems of suitable dimensions can still be packed into small volumes and are sufficiently portable to be carried by one or two persons for rapid deployment at the scene of the incident. This can be done using an SCBA cylinder that will inflate the system for use in less than two minutes. An inflatable unit can easily be moved to comply with the changing weather conditions, special features have been built in to make it stable in the most difficult weather conditions and it can be rapidly decommissioned at the termination of the operation.

For remote application and depending on ambient temperatures due consideration must be given to heating the water applied sufficiently to avoid further complications for the casualty or to enhance decontamination of PPE in Hazmat operations. A relatively low cost hot water unit has now been developed to meet this need.

It will be clear from the above that the technology now exists to address most decontamination problems that can potentially be encountered in our ever more complex 21st century society. However there is clearly a need to perfect the necessary procedures and drills and to provide the training to ensure that this new decontamination technology is available when it is needed.

Mark Whitcher is the Director and General Manager of Plysu Protection Systems. This UK based company has just been awarded the contract to provide the standard decontamination shower unit for the UK's hospitals and ambulance services and is regarded as a world leader in innovative decon technology.

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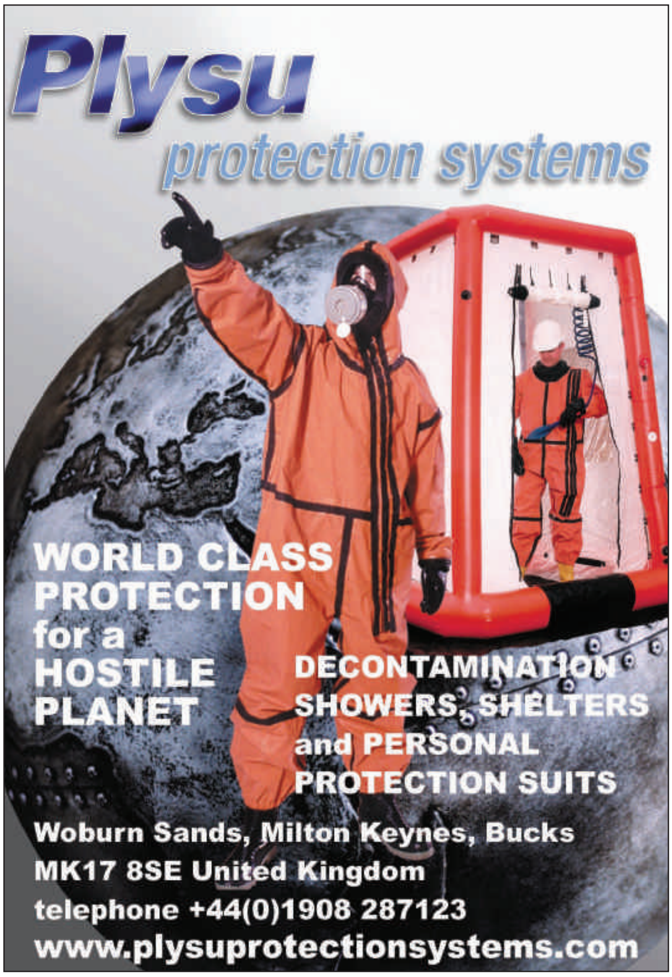

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International Training Standards

by Bill Savage
Head of Aviation Training

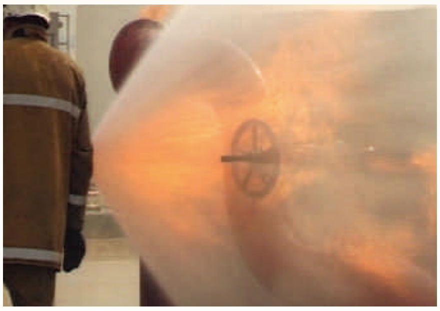
The International Civil Aviation Organisation was established at the Chicago Convention in 1944. The convention was the result of the coming together of most developed states having an air transport industry to establish standards and principles for the safe, efficient and orderly operation of international air transport. Standards and recommended practices are laid down through a series of "Annexes" which cover all aspects of international air transport. Standards and recommended practices for aerodromes were first adopted in May 1951 being designated "Annex 14". It is within this annex that the international requirements for rescue and fire-fighting services at airports are set out. In the context of training the Introductory note on rescue and fire-fighting is significant stating:

"The principle objective of a rescue and fire-fighting service is to save lives. For this reason the provision of means of dealing with an aircraft accident or incident occurring at, or in the immediate vicinity of an aerodrome assume primary importance because it is within this area that there are the greatest opportunities of saving lives. This must assume at all times the possibility of, and need for, extinguishing a fire which may occur either immediately following an aircraft accident or incident, or at any time during rescue operations.

The most important factors bearing on effective rescue in a survivable aircraft accident are: the training received, the effectiveness of the equipment and the speed with which personnel and equipment designated for rescue and fire-fighting purposes can be put into use.

Requirements to combat building and fuel farm fires, or to deal with foaming of runways, are not taken into account".

It is significant that of the three most important factors bearing on effective rescue in a survivable aircraft accident the training received is listed foremost. The annex goes on to advocate under Personnel: (9.9.30)


Picture courtesy of Fire Safety Engineering College of Oman

"All rescue and fire-fighting personnel shall be properly trained to perform their duties in an efficient manner and shall participate in live fire drills commensurate with the types of aircraft and type of rescue and fire-fighting equipment in use at the aerodrome including pressure fed fuel fires."

ICAO Recommends (9.2.31). "During flight operations, sufficient trained personnel should be detailed and be readily available to ride the rescue and fire-fighting vehicles and to operate the equipment at maximum capacity. These trained personnel should be deployed in a way that ensures that minimum response times can be achieved and that continuous agent application at the appropriate rate can be fully maintained. Consideration should also be given for personnel to use hand lines, ladders and other rescue and fire-fighting equipment normally associated with aircraft rescue and fire-fighting operations".

ICAO gives guidance on training requirements in Attachment A, Section 16 of the volume, the Airport Services Manual Part 1 and in its Training Manual Part E -2.

It is clearly evident that ICAO places considerable emphasis on training, contending that training underpins the effectiveness of the rescue and fire-fighting service at the scene of an aircraft accident, and goes on to offers guidance on such training, advocating that all rescue and fire-fighting personnel be properly trained. Why is it then that these training requirements do not figure significantly at airports throughout the world, or the interpretation of such requirements differ so markedly from one country to another. ICAO has a judicial function to consider disputes involving the interpretation or application of the convention or its annexes. It may impose penalties against a country or airline by way of the withdrawal of voting rights or the imposition of a fine. It also rules on any complaint as to preferential treatment, which may be given to a particular airline. It ensures for example, that entry requirements for one country are applied in the same way to all aircraft entering that country. It harmonises the requirements for the registration of aircraft, equipment and associated operating facilities. However ICAO has no direct power within individual countries, and indeed, countries are not obliged to accept all ICAO requirements, although there is a presumption they will comply unless a notification of exception is filed. In order therefore to ensure that international regulations are applied, each country has its own national aviation executive. For example, in the United Kingdom it is the Civil Aviation Authority; in the USA, the Federal Aviation Administration; in Oman, the Director General of Civil Aviation & Meteorology, and in the UAE (Abu Dhabi), the Department of Civil Aviation.

Picture courtesy of Fire Safety Engineering College of Oman

It is evident that International standards and recommended practices for RFFS at aerodromes are generally complied with where there is strong regulation and inspection, usually by a Civil Aviation Authority or similar Government arm which ensures compliance. Compliance is also more judicious and robust if international standards and recommended practices are incorporated into domestic legislation as in the United Kingdom and the United States. This makes the International requirements mandatory in terms of countries meeting their own indigenous legal obligations for aircraft rescue and fire-fighting provision.

Picture courtesy of Fire Safety Engineering College of Oman

Picture courtesy of Fire Safety Engineering College of Oman

However, interpretation of international standards by countries and their adoption into domestic legislation can bring about variations in certain aspects of rescue and fire-fighting provision between one country and another although fundamental prerequisites are invariably included. This is altogether another issue for future discussion.

In most developed countries aircraft rescue and fire-fighting personnel are trained to international standards and hold certificates of competence at various levels. Normally, in these countries, RFFS personnel are not being allowed to “ride” – form part of the rescue and fire-fighting crew at an aerodrome, without a certificate of competence. In developing countries this is generally not the case where the emphasis is generally on localised training for RFFS personnel. It is usually officers from such countries, who receive training to international standards, predominantly at overseas locations. These officers will then usually become responsible for the training of RFFS personnel. They will have little or no practical training experience, with very limited access to facilities, particularly practical facilities, aircraft simulators, pressure fed fuel fires, a breathing apparatus chamber, firescreen and so on. There is an indisputable gap in the approach to RFFS training and the levels of competence of RFFS personnel in developed and developing countries, which predominantly goes unnoticed. It is only when an aircraft accident occurs and the attention of the entire world is drawn to the accident site and searching questions are asked during the subsequent investigation, that prevailing standards of rescue and fire-fighting provision at an

International Training Standards

Picture courtesy of Fire Safety Engineering College of Oman

airport, together with all other aspects of safety, become exposed.

It is manifest that in developing countries there will be pressing demands on limited resources, which focus the attention of Government Ministers and those, responsible for the interests of the nation. In terms of a developing country's ability to meet its national and international commitments, RFFS at airports together with the associated resources needed, will be amongst the issues liable to be ignored whilst more pressing matters are addressed. This perspective generally sees the RFFS at airports lacking resources and more importantly the expertise and understanding to use what limited resources and equipment is available to best effect. This latter point is crucial for although resources and equipment may be limited well-trained personnel who can utilise what is available to maximum effect may have a positive chance of being successful at the scene of an aircraft accident/incident. When aid to developing nations in the form of RFFS resources and equipment is provided, personnel tasked with their introduction often do not have the knowledge or basic understanding to instruct or enlighten fire-fighters on its correct use, or methods of operation. Untrained RFFS personnel endeavouring to determine modes of operation of crash fire rescue vehicles have, on occasion, reduced an appliance's operational serviceability to a minimum. More commonly, sophisticated operating functions and operating safeguards built into an appliance quickly become ineffectual, reducing systems to manual modes of operation, merely because basic understanding and knowledge were lacking. I have seen sophisticated equipment donated by well-meaning fire services lying idle, being unemployed and collecting dust for the want of the expertise needed to introduce it into operational service. Conversely I have seen such equipment introduced incorrectly, with an outcome that a risk to the safety of RFFS personnel tasked with its use has been generated.

Picture courtesy of Fire Safety Engineering College of Oman

From any standpoint, personnel undertaking any form of employment must be trained and competent to undertake the duties and responsibilities for which they are liable to be tasked. Surely this is fundamental when personnel are liable to be tasked with saving the lives of others. Training RFFS personnel to a level of competence where they are operationally effective and capable of working satisfactory in a team is not complex. Training at this level fundamentally revolves around the practicalities of fire-fighting, hose running, ladder drills, knots and lines, hot fire training, breathing apparatus training, search and rescue and so. Once basic skills are established these may be incorporated in combined drills used to develop sound operational tactics and techniques, which ultimately enhance the utilisation of appliances and equipment.

In the Gulf Region and other countries where teaching difficulties associated with language and interpretation are likely to be encountered the "hands on approach" to training practical skills greatly assists students to grasp fundamental concepts. Fire-fighting is fundamentally a practical skill demanding sound practical ability, robust physical fitness, self-determination and motivation. What is probably more difficult to overcome is the burning desire of students from most developing countries to achieve high levels of technical understanding, seeking to gain qualifications and certification which gives credence to their training achievement. Whilst this is accomplished by some of the more able students attending training courses, it is not generally the case. This should not be seen in any way as disappointing, but rather a giant leap in the establishment of robust rescue and fire-fighting teams who, when called upon in the event of an aircraft emergency, will be able to utilise the appliances and equipment available to them to maximum effect. In this context if you were a passenger in a burning aircraft and you had a choice between Albert Einstein and Arnold Schwarzenegger to affect your rescue, who would you choose? You have approximately 90 seconds to make this decision; the wrong choice will mean your ultimate demise. This is of course a simplistic parallel; clearly men of great intellect have made aviation one of the safest modes of transport. However when aircraft accidents occur there is a need for positive and determined action demanding stamina, strength and resolve, if passengers and crew are to be rescued. Surely this is what ICAO seeks to achieve in terms of the training of rescue and fire-fighting personnel. Those personnel who have the capacity and wherewithal to progress their technical understanding should be encouraged to do so. They will become the officers in charge of airport crash crews, the best eventually becoming commanding officers of

Picture courtesy of Fire Safety Engineering College of Oman

respective rescue and fire-fighting services.

I have laid emphasis on developing countries and their need to promote aviation rescue and fire-fighting training. It should be remembered that there are some countries in the developed world that pay lip service to the provision of rescue and fire-fighting at airports. Whilst it could be argued that developing countries may have other priorities on which to spend vital financial resources, what reasons can those in the developed world put forward for shortfalls in RFFS provision and training. Economic viability, the need to ensure a cost-effective operation, a judicious interpretation of ICAO requirements may all be postulated. This will invariably produce a depleted RFFS, a token service that salves consciences, "it will never happen here". An example of cost effective RFFS at a Category 9 airport, which calls for three appliances to be available, invariably produces three RFFS personnel manning these vehicles. Such provision may indeed be cost effective but in practical terms such manpower levels disown any concept of rescue, let alone the reality of dealing with an aircraft accident/incident and the possible complexities, which may arise should there be of mass evacuation by passengers and crew.

Importantly in terms of RFFS personnel is their level of physical fitness; a problem predominantly identified with developed countries. How any fire-fighter can believe that in permanently carrying two or more stones excess bodyweight they will be able to perform effectively at an aircraft accident/incident defies common sense. NFPA annual figures on fire-fighter deaths in the United States show that the greatest proportion of those deaths occurs through heart related diseases/attacks. The rescue of passengers from within an aircraft cabin where passengers may be trapped or incapacitated, will in all probability require RFFS personnel to utilise breathing apparatus. Should there be a fire internally rescue cannot be effected safely without its adoption. The use of such equipment, even modern lightweight sophisticated apparatus, can be physically demanding. This scenario will demand well-trained personnel, who must remain calm, and composed so as to be effective, it may also require considerable physical exertion on their part. Without this capacity they will be ineffective no matter how sophisticated the equipment utilised.

Physical fitness training for RFFS personnel is fundamental and must become inherent in the lifestyle of all fire-fighters. This lifestyle should be developed and engendered during basic training and fully incorporated within ongoing daily training programmes.

The fact that a good number of senior officers ignore the obesity of their crews and their obvious lack of physical fitness is perhaps a testament to the labour laws within those countries, rather than to any lack of understanding on their part. This is one problem that rarely affects developing countries where obesity is rare, certainly to the extent that it is found in the developed world.

Physical training, together with fundamental basic fire-fighter training is a prerequisite for success at the scene of an aircraft incident. I have seen physically fit fire-fighters utilise forty-year-old appliances and equipment to maximum effect, almost as though it had come straight from the workshop and in pristine condition. They were well trained and well led and more than able to tackle an aircraft accident/incident, their self-confidence and zeal tangible. Conversely I have seen unfit and poorly trained fire-fighters with the most modern and sophisticated equipment being bewildered and perplexed because a "Ready Button" failed to function off cue. Whilst they were well equipped with an abundance of resources their lack of sound basic training was demonstrable as was the quality of leadership and self-motivation.

There is still much to be done in enhancing training of RFFS personnel in the Gulf region, but trainees are keen and enthusiastic and eager to enhance their practical ability and technical understanding. They demonstrate great pride of service and patriotism, which makes training enjoyable and outcomes more readily achievable. The Fire Safety Engineering College in Oman has made giant steps in the training of RFFS personnel from this region and whilst there still remains a good deal to be done solid foundations have been laid.

Emergency situations happen daily when people least expect them. Training people to react in the correct manner and ultimately save lives is vital. Realistic training is a key element in giving people the right tools to manage situations that may occur in their environment.

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Passive Smoke Management

by **Paul England**

Warrington Fire
Research, Australia

Smoke Leakage Rig.

SMOKE RATHER THAN HEAT has been identified as the major cause of fatalities in building fires. However historically Building Regulations in most countries have focussed on the fire resistance of barriers rather than their resistance to smoke.

The application of performance based approaches to fire safety design has led to a greater understanding of the importance of passive smoke management and recent development of test methods provides the tools for the performance of barriers to be measured and specified in quantifiable terms. These developments are important if passive systems are to be selected and specified with confidence by designers and checked by regulatory authorities.

This paper will provide an overview of the exposure conditions and new test procedures for assessing the performance of smoke barriers with the intention of encouraging the application of passive smoke management to achieve fire safe and cost-effective building design.

CHARACTERISATION OF FIRES FOR DESIGN OF BARRIERS

To specify passive smoke control barriers confidently it is first necessary to characterise fires. A compartment fire can be defined as a four-phase phenomenon comprising:

1. Establishment phase
2. Main growth phase
3. Fully developed phase (post flashover)
4. Decay phase

Refer Figure 1. For design purposes it is appropriate to adopt a simple approach and define bounding conditions in terms of enclosure/hot layer limiting temperatures.

The upper bound adopted for the establishment phase is a hot layer temperature of 200°C. This limiting value has been selected because:

- The radiant heat flux from the hot layer will not significantly increase the burning rate of the fire and heat transfer by convection from the hot layer will not be sufficient to significantly accelerate the production of volatiles throughout typical enclosures. Above 200°C the hot layer may begin to influence fire growth.
- Most automatic suppression systems would activate and maintain enclosure temperatures below 200°C.
- First aid fire fighting by occupants has the greatest probability of success at hot layer temperatures below 200°C.
- A limiting value of 200°C is compatible with air leakage test methods such as AS 1530.7,[1] UL 1784.[2]

The duration of the establishment phase can vary from a few minutes to several hours depending amongst other things on the ignition source, the item first ignited, ventilation conditions and the size of the room. Only a small proportion of fires have the potential to progress beyond the establishment phase. Many fires remain localised until they burn out, are dealt with by the occupants or are automatically suppressed.

The main growth phase relates to the stage of fire development when the radiant heat from the hot layer begins to significantly accelerate the burning rate and the fire is of sufficient size to rapidly spread across the surface of an object or spread to adjacent objects. Usually the growth rate during this period is relatively rapid unless the oxygen supply to the fire is constrained. Successful manual fire suppression by the occupants during this stage would be unlikely. During this phase additional openings may form (e.g. breakage of windows due to the imposed heating).

For simplicity, flashover is commonly treated as an event, which occurs at a prescribed heat flux (typically $20kW/m^2$) at floor level or a hot layer temperature or temperature rise (typically 600°C). Temperatures attained during the fully developed phase typically lie in the range of 800°C to 1200°C depending upon a number of variables including:

- fire load
- type and configuration of fire load
- ventilation conditions
- thermal properties of the boundaries

The duration of the fully developed phase can vary from as little as two minutes to several hours and is dependent upon the same variables that affect the maximum temperatures attained, which are listed above

The decay phase can be arbitrarily defined as the period after the average enclosure temperature has decreased to 80% of its peak but temperatures may remain high around some fuel packages (contents) even when the average temperature has dropped considerably.

DESIGN EXPOSURE/ TEST EXPOSURES

Exposure to smoke can be defined as a combination of thermal actions, differential pressures, and concentrations of products of combustion.

The thermal actions in relation to passive barriers can be conveniently split into the following ranges to facilitate establishing their performance as a barrier to fire and smoke:

- ambient temperature exposure (typically up to 40°C)
- medium temperature exposure (typically up to 200°C)
- high temperature exposure (a temperature regime representative of the main growth and fully developed phases)

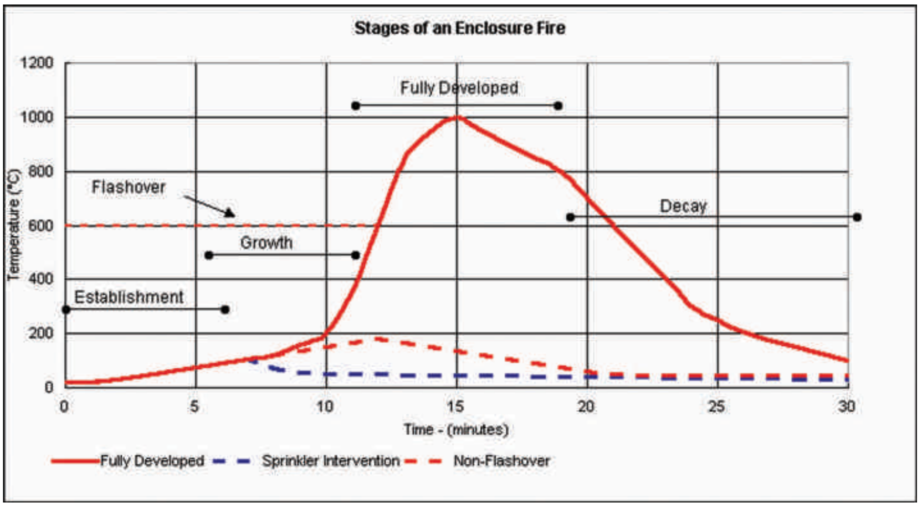

Figure 1. Phases of Fire.

Within the enclosure of fire origin ambient temperature exposure corresponds to a smouldering fire, and for many barrier design applications need not be considered because smouldering fires are generally only a threat to life within the enclosure of fire origin and will not degrade the barrier significantly.

Within the enclosure of fire origin medium temperature exposure (200°C) corresponds to small fires (in comparison to the size of the enclosure), the early stages of a larger fire, or the upper bound enclosure temperature for automatically suppressed/controlled fires. Temperatures of 200°C or less can be sufficient to cause significant degradation of a barrier. Two examples are given below:

Leakage through a closed door, even if fitted with smoke seals can cause life-threatening conditions in an adjoining space unless the seals are designed to accommodate the differential movement between the leaf and frame.

UPVC pipes can soften and collapse at temperatures substantially below 200°C allowing the passage of smoke where the pipes penetrate barriers.

> *UPVC pipes can soften and collapse at temperatures substantially below 200°C allowing the passage of smoke where the pipes penetrate barriers.*

For the assessment of elements of construction exposed to high temperature it is common to combine the main growth, fully developed and decay phases and adopt the standard heating regimes specified in ISO 834,[3] AS 1530.4[4] and BS 476 Part 20.[5] It has been recognised that more rapid temperature rises can occur and alternative heating regimes such as the hydrocarbon-heating regime are being prescribed more frequently. The traditional and hydrocarbon heating regimes are shown in Figure 2 with typical enclosure fires obtained from full-scale experiments. It can be seen that the hydrocarbon fire more accurately simulates the main growth phase.

Pressure differentials generated by

High Temperature Smoke Leakage Apparatus.

Passive Smoke Management

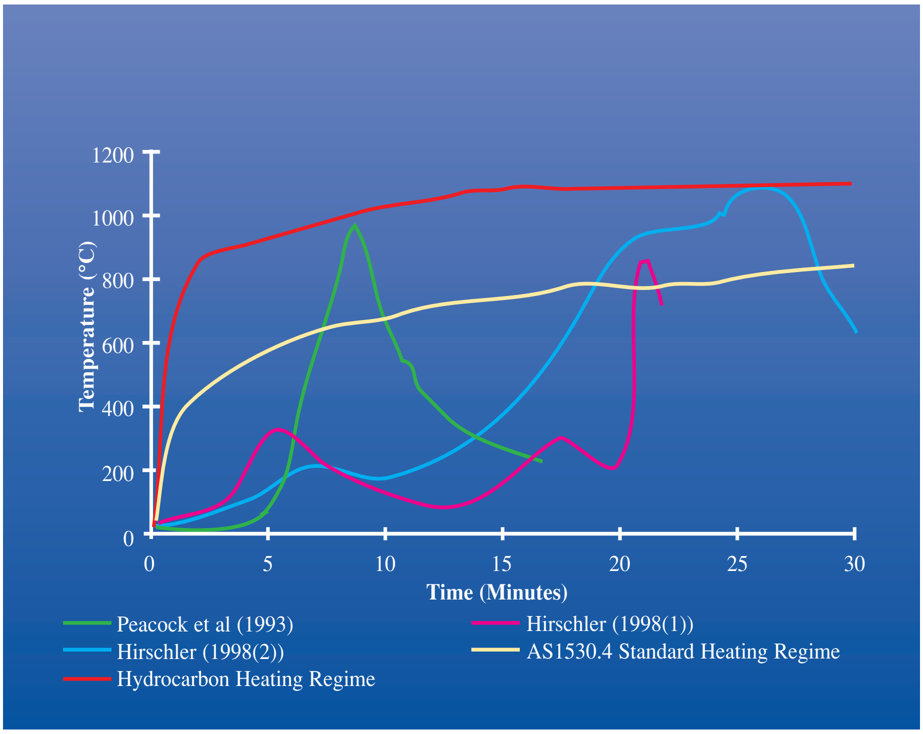

Figure 2. Enclosure fire temperatures and standard heating regimes.

the buoyancy of hot gases from a fire are a function of the temperature, and the enclosure height above the neutral axis but are generally below 10Pa for medium temperature conditions and 20 Pa for high temperature conditions in small enclosures. However, pressures as high as 50-100Pa can be generated by stack and piston effects for example.

Estimating smoke species concentrations is a complex subject and lies outside the scope of this paper. For many applications close to the enclosure of fire origin it is reasonable to crudely correlate enclosure temperature rises with species concentration. Methods are presented in Klote and Milke[6] and England et al.[7] Temperature rises as little as 10°C–20°C can reduce visibility below design limits.

TEST METHODS

Standard air leakage test methods for doorsets at ambient and more recently medium temperatures have been published (eg AS 1530.7: 1998[1]). These test methods can be also applied to wall/floor system and service penetrations such as plastic pipes and air dampers. The test method involves mounting the element of construction in front of an enclosure and measuring air leakage at a range of pressure differentials, at ambient and medium temperature.

Acceptable leakage rates can be calculated for specific applications either by assuming the development of a hot layer and allowing for air entrainment after the smoke passes through leakage paths and/or assuming full mixing of the smoke. Recent research undertaken by Warrington Fire Research has shown that smoke leakage through solid core doors can rapidly cause untenable (life threatening) condition in adjacent enclosures. Other preliminary results indicate that the selection of smoke seals is critical. For example a seal fitted to a solid core timber door exhibited a high level of resistance to smoke spread when exposed to ambient temperatures, but at medium temperatures the leakage was similar to a doorset without smoke seals. Therefore simple specifications such as solid-core doors with smoke seals do not necessarily achieve the desired outcome.

A more suitable specification for a medium temperature smoke door would be:

- The door opening shall be protected by a self closing smoke door with a leakage rate of not more than nn m^3/h when exposed to a medium temperature air leakage test in

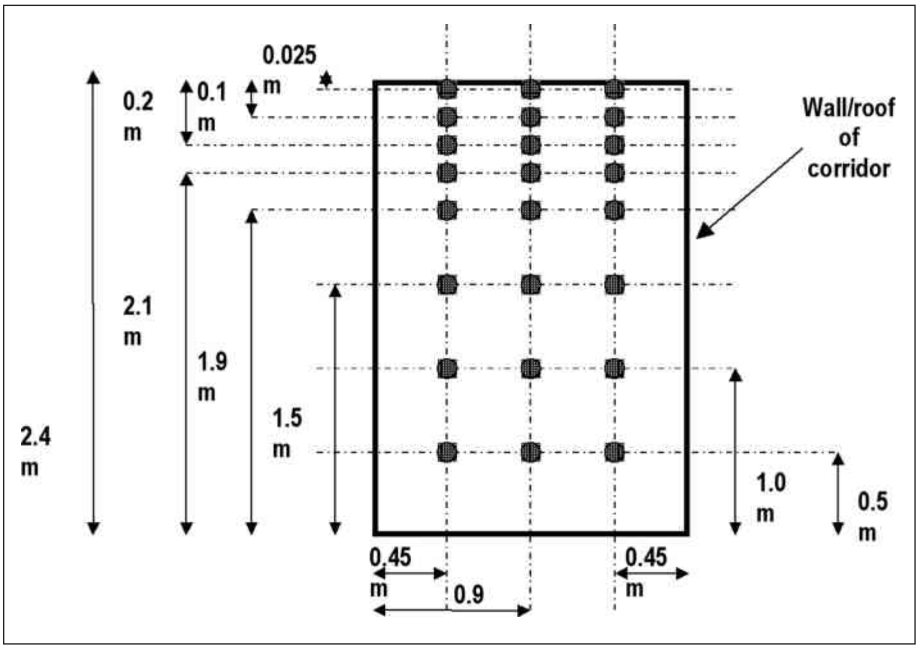

Figure 3. Layout of a typical array of corridor thermocouples.

accordance with standard xyz at a pressure differential of nn Pa or greater from both directions.

A typical test rig and specimen for testing to AS 1530.7 is shown in picture, p.64.

Whilst fire resistance tests such as AS 1530.4 and BS 476 Part 20 expose elements of construction to high temperatures they do not provide an indication of smoke leakage and smoke production. A simple addition to the fire resistance test procedures involving the application of an instrumented enclosure provides a practical method for obtaining data suitable for specifying smoke control measures at high temperatures. The method is described in Young & England 1999[8] together with examples of derived data. The method can be downloaded from www.wfra.com.au.

> *Recent research results have shown that smoke barriers such as solid-core timber doorsets are not as effective as once thought, unless they are fitted with compatible seal combinations.*

The test arrangement is shown in picture, p.65. A typical array of thermocouples is shown in Figure 3.

The method defines a smoke spread parameter as the time for the average enclosure air temperature at a nominated height to exceed a specified temperature rise. The temperature rise can be loosely correlated to visibility and concentrations of toxic species.

A typical specification could require a temperature rise of 15°C, at a height of 1.5m, not to be exceeded within 15 minutes exposure to the standard heating regime of ISO 834.

CONCLUSIONS

This paper has provided a simple overview of available methods for measuring the performance of smoke resistant barriers. The methods cover the range of exposure conditions expected for most fire scenarios and present quantitative results in a form that can be readily used by fire safety engineers, designers/specifiers and regulatory authorities for both performance-based and prescriptive designs.

Recent research results have shown that smoke barriers such as solid-core timber doorsets are not as effective as once thought, unless they are fitted with compatible seal combinations.

The range of test methods described is already assisting supplies to provide comprehensive information on their systems in a form that will encourage the application of passive smoke management in order to achieve fire safe and cost-effective building designs.

References

[1] AS1530.7, “Methods for fire tests on building materials, components and structures – Smoke control door and shutter assemblies Part 7 ambient and medium temperature leakage test procedures”, 1998, Standards Australia.

[2] UL 1784, “Air Leakage Tests for Door Assemblies”, Underwriters Laboratories.

[3] International Standards Organisation, “Fire Resistance Tests. Elements of Building Construction. Part 1 General requirements. International Organisation for Standardisation, Geneva, 1999.

[4] AS1530.4, “Methods for fire tests on building materials, components and structures – Fire-resistance test of elements of building construction”, 1997, Standards Australia.

[5] British Standards Institution, “Method for determination of the fire resistance of elements of construction (general principles)”, BS 476 Part 20, 1987.

[6] Klote, J.K. and Milke, J.A., “Design of Smoke Management Systems”, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Atlanta, GA, 1992.

[7] England J.P, Young S.A, Hui M.C, Kurban N., “Guide for the Design of Fire Resistant Barriers and Structures Warrington Fire Research/Building Control Commission, Melbourne Victoria 3000, 2000.

[8] Young, S.A. and England, J.P., “The Performance of Doorsets to Restrict the Passage of Smoke when Exposed to Fully Developed Fires”, Interflam ’99.

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Managing Risk in the Global Environment

Picture courtesy of Fire Service College

by **Bill Tucker** BSc(hons), MSc, FIFireE, MIOSH RSP

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Successful businesses are those that are able to quantify the elements of risk taking and through analysis have in place sensible cost effective measures to identify hazards of whatever complexity and put in place the necessary control measures to counter their effects.

To aid this process it is necessary to consider the effective management of risks in the wider sense if all risks are to be evaluated.

In the case of the losses from a serious fire the indirect consequential losses e.g. loss of product to a competitor or a loss of a skilled workforce can be more catastrophic than the loss of the building itself.

Historically conventional fire risk assessment has purely consisted of a collection of information related to matters considered being hazardous but with no real computation as to the degree of risk posed to the organization or what the effects will look like in the event of a fire or other critical happening.

This is not entirely helpful to businesses in quantifying risk, what is required is a more measured system of analysis that expresses in simple terms where a Fire it is most likely to occur and what the effects of it will look like before it happens.

This exposes the true risk presented to the organization and the options open to either eliminate the risk entirely or reduce its effects. Whilst life safety is of paramount importance so is the risk to protect all the organizations' vital assets if continuity of business is to be secured.

The need to adopt a more measured approach to fire risk management and assessment has never been more prominent.

> With greater demands being put on the commercial and industrial sectors to put in place effective loss control measures the management of risk requires to be placed higher on the agenda of organizations that want to take asset protection seriously and remain competitive across global markets.

The Building Fire Performance Evaluation Methodology

The Building Fire Performance Evaluation Methodology (colloquially referred to as The "Method") evolved from primary research by Dr. Robert W. Fitzgerald, a structural engineer from Worcester University Massachusetts.

Developed over the last four years, the Fire Service College adopted a version whose primary usage was seen as a risk-validation tool for the UK Fire Service. It is currently in use as part of a risk assessment package.

Since then its use has expanded rapidly and is now accepted as a credible Risk Analysis tool for commerce and industry.

The "Method" provides a framework for thinking, by organizing and structuring the analysis. It views the building as it is, not as it is thought to be. The Method will also predict building performance in the most likely worse case fire scenario and communicates the results.

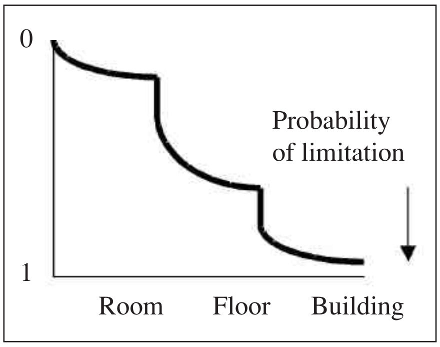
The Method organizes the building-fire systems into discrete components and structures these components together with time dependence into a logical whole. It will thereby evaluate the performance of a building under fire conditions and provide a descriptive format. It also allows an assessment of risk for people, property the environment and business continuity.

> **Components of the Method are** Fire Behaviour, Active Fire defenses e.g., Sprinklers, Automatic Fire Detection; Passive Fire defenses e.g., Compartmentation, Fire Brigade action, Structural Frame Behaviour, Human Behaviour and Time. The performance is evaluated via numerical description, which is a vital part of the complete process. The evaluations are expressed as probabilities and these probabilities may be based on relative frequency information if available, e.g., reliability of sprinklers. More likely, they will be an expression of a 'degree of belief', e.g., exercise of judgment.

The descriptive format of the Method produces graphical descriptors of the limits of fire spread (L-curve), smoke tenability, building egress and structural performance. The L-curve, being the most relevant. The L-curve is a representation of the "Life Safety" limits of the building, using the extent of flame-heat spread before the fire is terminated as a prime indicator. The curve expresses the probability of success of fire-spread limitation.

The fire can only be terminated in three ways – itself – it runs out of fuel, by automatic sprinkler suppression or manual intervention by fire fighters.

The curve starts from ‘established burning’ not ignition. The L-curve can be produced directly by experienced users or by a combination of I, A and M analysis, (which are explained below).



L-curve of a typical 3-space multi-storey building.

Established burning is the fire size from which the fire is more likely, in the short term, to get bigger than smaller. Moreover, the rate of increase in size is likely to be more practicable. The fire size, that is demarcation between fire prevention measures and building design. For compartment buildings, a flame height of about 25cm in a fuel package is a good choice for established burning.

The I-curve evaluation (which represents the fire itself) is produced as a result of a space-barrier analysis of the building. It represents the relative fire growth potential for the interior of a room. The A-curve evaluation combines the reliability of the sprinkler system with its design effectiveness. The graphical representation, of the probable effectiveness of a fixed fire fighting installation in limiting fire development. The M-curve evaluation is a combination of the effects of a building’s site, its architecture, the availability of water, the size of the fire on arrival on fire fighting effectiveness.

The L-curve evaluations enable: identification of the building-specific risk to people, property and mission /business continuity, examine details of the fire performance, discuss and evaluate alternatives, recognize why one course of action is more desirable than others and decide on the best use of resources.

The L-curve being the most prominent Descriptor involves a number of steps.

■ Step 1 Treat all buildings as a three-space building, first space – where the fire starts, e.g. a room, second space – adjoining areas, e.g. adjacent rooms or floors to the side or above, third space – rest of the building. The reason for this is that, in general, fires spread in all directions, but floors and ceilings tend to be better barriers than walls, partitions or doors.

■ Step 2 Identify a suitable space of origin for our ‘design fire’. Estimate the likelihood of limitation therein using the following as a guide:

Very likely	90%-80%
Likely	70%-60%
Unlikely	40%-30%
Very unlikely	20%-10%

If self-termination is unlikely, estimate the time to full-space involvement. Identify the impact, if any, of sprinklers.

Some factors to consider when choosing a space of origin are: which space poses the greatest threat of fire growth potential? Which space would cause the greatest problem for life safety? Which space is most vulnerable in terms of property protection or business continuity? Which space has the weakest surrounding barriers? Which space would cause the greatest problem for manual fire fighting?

The factors to consider when estimating the likelihood of limitation in the space of origin are: the shape and size of the space, the characteristics of the fuel, the size and number of fuel packages and the fuel/space geometry, eg., stacked, separated, close to wall, close to ceiling, etc.

Full Space Involvement (FSI) is the condition where all combustible materials in the space are surface burning. FSI is often synonymous with flashover and can also occur by spread-over. The fully developed fire is often termed the post-flashover fire and burns at a uniform rate. This stage of the fire has a great impact on the structural frame and the barriers.

There are several factors to consider when assessing the effectiveness of sprinklers, firstly are they present? Consider the hazard classification of the installation and the nature of the fuel. Check that sprinklers are not obstructed and are able to operate, i.e. not painted over. Water will flow if the sprinkler fuses and will flow in sufficient quantity.

■ Step 3 Examine the barriers that surround the space of origin. Estimate the effectiveness of the barriers in limiting fire spread:

Very likely	90%-80%
Likely	70%-60%
Unlikely	40%-30%
Very unlikely	20%-10%

For unlikely limitations, estimate how long the barrier will last. Keeping in mind the ways in which barriers fail e.g. barrier collapse, large openings, e.g., doors wedged open, windows, etc., weak barrier segment, e.g., glass panels, roof-lights, etc., weak barrier junctions, unstopped penetration. Barrier performance depends on the construction, fire severity and duration.

Picture courtesy of Fire Service College

■ Step 4 Follow the space-barrier analysis through all three spaces. At each stage, estimate likelihood of limitation and, if unlikely, time to failure. Estimate the time taken for fire development from established burning to full building involvement. This is often best achieved by a time-line.

■ Step 5 Estimate a time-line for application of water by the Fire Brigade. Start from established burning, and consider – time to detection, time to notification of Fire Services, the time to reach the site and time taken to apply water. Compare this time-line to the fire development time-line. Estimate the effectiveness of the Fire brigade in extinguishing the fire.

■ Step 6 Draw the L-curve! L-curves drawn towards the top right of the evaluator characterize weak buildings. In a weak building, there is little likelihood of the flame/heat spread being limited by the building before the building is destroyed. L-curves that are drawn towards the bottom left of the evaluator characterize strong buildings. In a strong building, the fire size is likely to be limited at the early stages of fire spread.

The importance of the L-curve is that it will predict the building-specific fire performance. It identifies the fire hazard at each stage of the fire development in the building. It indicates the severity of the consequences of a fire in the building and aids the evaluation of risks for the most likely worse case fire scenario.

The Fire Service College has amassed considerable experience in applying the “Method” across a wide range of buildings and through its consultancy service offers a unique service to organizations seeking to implement Effective fire risk management.

EDWARDS SYSTEMS TECHNOLOGY

New fire alarm control panels offer the best of both worlds

A new line of fire alarm control panels from Edwards Systems Technology, Inc. (EST) liberates small and medium-sized buildings from the all-or-nothing approach to system design. QuickStart life safety systems support intelligent circuits, conventional circuits – and a combination of both.

QuickStart lives up to its name in every respect. Its exclusive auto-learn routine, combined with its built-in scanner port ensures a fast, trouble-free installation every time.

New installations benefit from EST's widely acclaimed Signature Series family of intelligent detectors and modules. Now no job is too small for true multisensor technology, environmental compensation, electronic addressing, and the power of intelligent processing that, before QuickStart, was the exclusive domain of big systems.

Retrofit applications enjoy the best of both worlds. QuickStart's support for both intelligent and conventional circuits ideally positions this innovative control panel for upgrading an existing system all at once – or in stages. With Signature Series' unique ability to use existing wiring, expensive communications-grade cable and costly rewiring is not required in most retrofit situations. This means every retrofit can enjoy the benefits of a major system upgrade without the cost or disruption to building activities normally associated with a life safety overhaul.

New or retrofit, QuickStart's application flexibility and ease of operation make it an ideal choice for schools, apartment building, hospitals, office building and retail facilities. Easy to install, simple to set up, and rock-solid when it comes to performance, QuickStart control panels are an installer's dream and a building owner's delight.

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FIRE PROTECTION AUSTRALIA ASSOCIATION (FPAA) CONFERENCE & EXHIBITION

A major fire conference and exhibition will be held in Brisbane, Australia, 26 – 28 June 2002. The event, *Fire Australia 2002* is being organised by Fire Protection Association Australia and the Institution of Fire Engineers, Australia will address the theme: *Fire: Life, Property & the Environment.*

One of the key issues to be addressed is the future of fire protection. New developments in communication with occupants and the practical application of philosophies such as "protect in place" will be discussed. Approaches to ensuring that maintenance of essential safety measures in buildings. Training and accreditation of fire protection specialists will also be covered.

Key speakers on the program will include Peter Johnson, Arup Engineering, Prof. Dato' Jaafar Sidek bin Tambi, Director-General of the Fire and Rescue Department, Malaysia, Dr Guylene Proulx of the Research Council of Canada, and Dr Paula Beever of the New Zealand Fire and Rescue Authority.

A preview of some of the key speakers and their presentations can be found at the website: www.fpaa.com.au.

The exhibition will be a major fire event in its own right, targeting not only conference delegates, but also a wide range of fire protection regulators, advisors and buyers from the fire industry, end user industries and the fire services. Every opportunity will be provided to assist exhibitors to showcase their companies and their products.

To further the opportunities for such promotion, part of the program will be dedicated to presentations and workshops provided by participating exhibitors and sponsors.

Opportunities exist to further promote the profile of companies through a number of sponsorship opportunities.

The *Fire Australia* series of conferences and exhibitions has for many years been the premier fire protection event in the country. Jointly hosted by Fire Protection Association Australia and the Institution of Fire Engineers Australia, the conferences and exhibitions have drawn delegates and exhibitors from all corners of the globe.

For more information, please contact:
Fire Protection Australia Association
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E-mail: events@fpaa.com.au

FM-200 CD-ROM

The World's Most Trusted Choice in Clean Agent Fire Suppression

Great Lakes Chemical Corporation has created an informative, interactive CD-ROM programme that provides an excellent introduction to FM-200 fire suppressant and the benefits it provides for a wide range of fire suppression applications. The programme is segmented so that everyone involved with the purchase of an FM-200 system – specifers such as architects and engineers, risk managers like insurers and local fire authorities, end users who own or manage properties and OEMs and distributors who sell and install these systems – can review information specific to their needs. The programme also includes a unique feature that allows users to connect with the FM-200 Website (www.fm-200.com) for additional detailed information, or to save specific Web links on their desktop if they are using the CD-ROM offline.

FM-200.COM WEBSITE

The FM-200 fire suppression Website, www.fm-200.com, offers visitors basic information about the world's most trusted choice in clean agent fire suppression, as well as in-depth scientific, technical and system design data. The site includes the largest publicly available archive of FM-200 information. Visitors also have access to newsletters and press releases; case studies showing FM-200 systems in action; answers to frequently asked questions; information on fire suppression theory; system design basics and application-specific information; and more. To access the technical library on the website, visitors must register by selecting the Login/Register link at the top of the home page and completing their profile.

For more information, please contact:
Great Lakes Chemical Corporation
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Website: www.fm-200.com

NEW HOLMATRO® RIM ADAPTER SET FOR LIFTING OF HEAVY VEHICLES

Holmatro® introduces a new product: the rim adapter set. This new product can be used for lifting of heavy vehicles and pushing away of the steering column of trucks. The rim adapter set offers substantial advantages in terms of safety, speed and user-friendliness.

A victim that gets trapped underneath a truck, needs to be freed from his critical position as quickly and as safely as possible. With the Holmatro® rim adapter set the rear wheel can be lifted by just a few simple operations. This way the victim can be freed quickly and safely and the rescue worker does not have to go underneath the vehicle.

Victims often lie near or under the rear axle of a vehicle, which means that the vehicle cannot be lifted at that spot. Lifting the vehicle frame is also a problem, because trucks often are air suspended and the wheels have a relatively large "stroke". The large lifting height – which then becomes necessary – would lead to unsafe and uncontrolled situations. Lifting the vehicle at the rear wheel is therefore the safest solution.

Another problem occurs when a driver gets trapped under the steering column of a truck. As opposed to passenger cars, the B-post of a heavy vehicle often cannot be used when pushing away the steering column. Moreover, a cross head can be pushed through the bottom plate. Again, the rim adapter is the solution.

The new Holmatro® rim adapter set fits on every 16.5 tons Holmatro® ram jack, so little extra space is needed in the rescue vehicle. A tilting saddle is licked to one side of the ram jack – a tool often already present in the rescue vehicle – a rim adapter to the other side. The support plate and tensioning belts keep everything in place.

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E-mail: info@holmatro.com

LION APPAREL COMES TO ASIA

Lion Apparel, the global leader in the manufacture and supply of Structural Firefighting Garments, has recently established a Regional Office in the Asia Pacific Region.

The Lion garments are well known throughout Asia with the product range long being supplied direct from the USA head office in Ohio, or through their European operations.

Following the success in securing the New Zealand Fire Service contract, and other high profile prospects in the Region, it was deemed important for a local presence to be permanently located in the Region to manage the rapid growth of the business.

Warren Hoare, with over 27 years experience with Personal Protective Equipment, has been appointed as Regional Business Manager for Lion and is servicing all countries within the Asia Pacific region from that office. The Lion global technical team supports Warren and his staff.

Lion Apparel will offer technical Firefighting assemblies that comply with the rigours of high level compliance to EN 469 together with the climatic needs of the region including; light weight, only premium components throughout including a Gore-Tex moisture barrier to maximise protection and breathability. We acknowledge the historically long delivery periods that Asian customers experience and are thus providing a stock assembly offering 14 days delivery, from 1st April.

Exciting news is the establishment of a Lion TotalCare Centre in Auckland, New Zealand. This facility is purpose built to provide a logistics, distribution service, laundering and repair centre purely to service the needs of New Zealand Fire Service who chose Lion to manufacture it's new generation garments.

For more information, please contact:
Lion Apparel – Asia Pacific
Tel: +61 (0) 8 8354 3766
E-mail: lionasia@lionapparel.com

FOAM-TO-GO SOLUTIONS FROM MACRON

A variety of mobile foam proportioning and foam generation solutions are now available from Macron, including the FireDos foam proportioning system and a number of trailer-based options.

FireDos, which can be mounted on the back of a fire truck or on a skid frame, is claimed by Macron to represent a major step forward in foam generation, thanks to its ability to introduce firefighting concentrate into the water stream with previously unobtainable accuracy. Two dosing pumps, driven by water flow, work independent of each other across a wide range of proportioning ratios.

FireDos offers an exceptional range of flows – from 2 lpm [litres per minute] all the way up to 800 lpm and, providing there is a flow, the system can cope with high back pressures. Hence, FireDos is ideal for use with foam risers in multi-storey buildings or with ladder platforms.

Macron's trailer-based foam generation includes the FE900 two-wheeled trailer, which has 900-litre capacity and a choice of either a foam or water/foam monitor, and the FE1800 where the capacity increases to 1,800 litres. The rough terrain PE100 trailer offers the twin benefits of exceptional mobility and a manual locking device that is a major boon to fast deployment. Macron's Specialist trailer incorporates an 11,000 lpm monitor that is designed for rapid reaction to oil storage tank and other special hazard fires.

Whichever model is selected, the trailer chassis are finished in welded rolled steel with the option of a galvanised finish that is suitable for hazardous environments. They can be supplied in readiness for fitting a monitor or, more usually, are supplied with a monitor that is self-inducing, requiring only the attachment of a water supply for immediate operation. The trailer's tanks are twin-pack epoxy lined and are suitable for use with all types of foam concentrate. Baffle plates are fitted to prevent water surge when towing and ensure stability.

Another option from Macron is the MF140 mobile foam unit that is designed for one- man operation. Effectively a mini fire appliance, the MF140 incorporates a 140-litre foam concentrate tank, a variable foam inductor, a low expansion foam branch pipe and two of Macron's Viking fire hoses, plus connectors. Other foam generation options from Macron include two portable models, the Fomax 7 and the Mini Fomax.

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PREMIER HAZARD SYSTEMS LTD.

WORLD'S FASTEST FIRE & RESCUE TEAM CHOOSES PREMIER HAZARD

"Our fire and rescue support for Bluebird in all its world speed record attempts demands a specialist vehicle fitted with the latest state of the art equipment," says Surefire 1 project manager, Richard Baker "that's why the Surefire 1 team has opted for lightbars from Premier Hazard."

All speed record attempts need sophisticated and highly responsive specialist safety support and Baker and his team, MG Rover Group Firefighters, provide emergency cover for the Bluebird Project during their record attempts. Surefire 1, a team of dedicated fire rescue vehicles is Baker's brainchild.

Surefire1 vehicles include a highly tuned MG ZT provided by MG Rover, which like the others has been purpose-built to support the Bluebird land speed and the Quicksilver world water speed challenges. Both vehicles feature Premier Hazard equipment, made at the company's factory in Leeds, England.

"Surefire's official motto is 'Safety in style throughout the measured mile'", says Premier Hazard's sales director Len Henshall, "And that's exactly what Premier Hazard sets out to do, so we're very excited that our blue market products are aiding Richard's project."

Details on the latest range of Blue Market products are depicted in new-look product catalogues from Premier Hazard. The catalogues contain the very latest in lightbars and vehicle warning systems (seven Blue Market and five Amber Market). Featuring Premier Hazard's bright new logo, which incorporates the line, 'Warning the World,' both catalogues have been carefully compiled for the convenience of its customers. The 56-page Blue & 44 page Amber Premier Hazard Product Catalogues are available on request from our Sales Department.

Premier Hazard is a member of the Specialised Vehicle Systems Division of Britax International PLC that also includes Britax PMG Limited and Code 3 Public Safety Equipment Inc, based in the USA.

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THE RJA GROUP AND THE CHINA ACADEMY OF BUILDING RESEARCH SIGN MEMORANDUM OF UNDERSTANDING

The RJA Group, Inc. is pleased to announce a Memorandum of Understanding with the Institute of Building Fire Research of the China Fire Academy of Building Research (CABR) on the sharing of knowledge and technical services.

The Memorandum of Understanding allows The RJA Group and CABR to develop opportunites for joint project work on buildings in China that require advanced fire protection engineering to achieve fire safety solutions.

Martin H. Reiss, President & CEO of The RJA Group states, "This agreement now gives project owners in the People's Republic of China the opportunity to use the expertise of The RJA Group through CABR." Reiss further adds, "In addition, CABR now has access to the free exchange of technical information, previously unavailable, on fire protection technologies. This will improve the design and ultimately the safety of the building, its occupants and property."

The worldwide leader in fire protection consulting, The RJA Group, Inc. is the parent company of Rolf Jensen & Associates, Inc. (RJA) – fire protection engineering consultants, Sako & Associates, Inc. – security and communications consultants, Fire Protection Management, Inc. (FPM) – construction management consultants and Protection Knowledge Concepts, Inc. (PKC) – training consultants.

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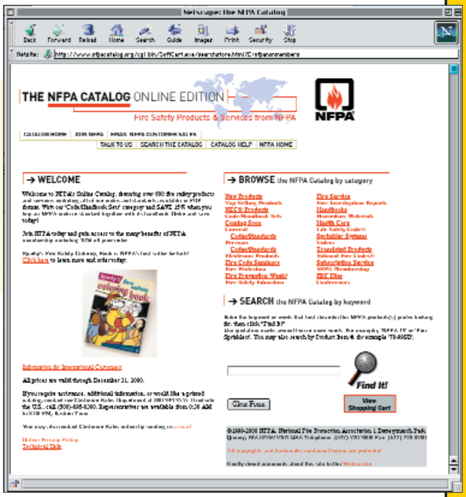

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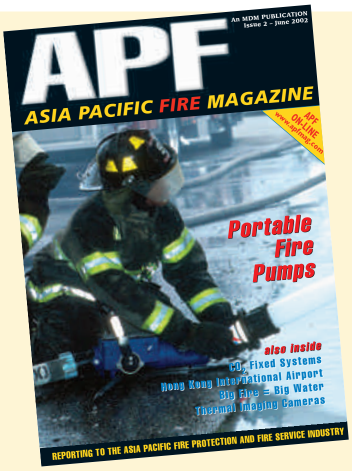
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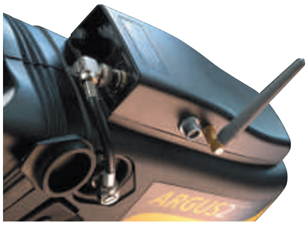

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FOREWORD

by Jeff Godfredson

NFPA's Asia-Pacific Operations Director

FIREWORKS

IT SEEMS THAT in the last few weeks, every fire related magazine or newsletter had an article discussing a fireworks disaster at some location around the world. As a result I did some research on the Internet and was taken back by the results. The numbers killed or injured are unacceptable.

Whilst it is true that fireworks were invented in China and are of significant cultural importance in Asia, the problems occur worldwide. Fireworks related tragedies have occurred in the following countries to name a few: Peru, Netherlands, China, Mexico, Portugal and the USA. The largest number of people killed in a single incident was over 300 persons in Lima, Peru. The other incidents have killed smaller numbers of factory workers, school children and citizens. There are many more people horrifically injured. It is clear that the manufacturer, storage and retail sale of these products in close proximity to the populace is a recipe for disaster. This is borne out by the various incidents, which have occurred.

Over time, some jurisdictions have responded to these incidents and banned the sale and use of fireworks by the public. A number of large cities in Asia have such bans (Singapore, Hong Kong, Beijing). These bans do not preclude public displays managed by professionals.

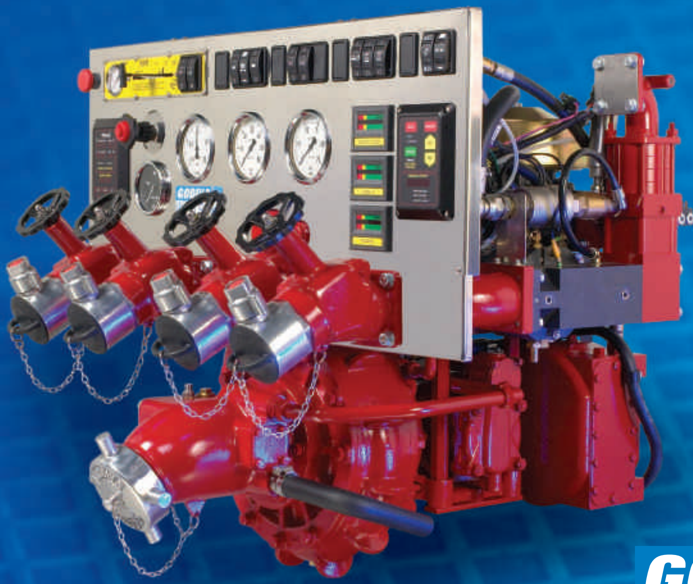
NFPA, a leading authority on fire related issues, takes the view that the use of fireworks should be left to the professionals.

When an event occurs involving fireworks, which result in loss of life and injury, there is usually a rush to appoint blame. The persons usually held to account are the business people involved in the manufacture, storage and retail sale of these goods.

Given what we know of the circumstances leading to these tragedies, it is possible to find legislative solutions to these problems. Any legislation is only as good as its enforcement. Given the social, cultural and economic implications of such change, it is not easy and requires courage. Without it we will see these problems continue.

Jeff Godfredson
NFPA's Asia-Pacific Operations Director

The innovations continue...



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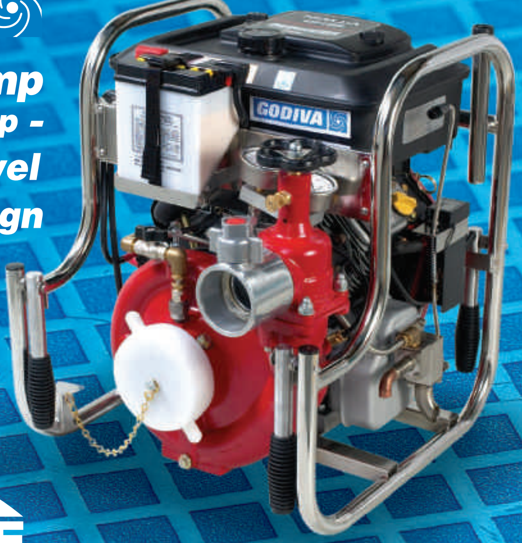

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Lightweight Portable Pumps

by David Burton
Hale Products Europe Ltd

Picture courtesy of Hale Europe

THE LIGHTWEIGHT PORTABLE PUMP has always been an important part of the fire-fighter's equipment, it is a versatile unit playing many roles – supplying water from open sources to the main vehicle pump, as a back-up to the main pump and as a pump to relieve flooding. There are increasing demands for a portable pump to be lighter, more compact and still give a powerful performance, as the space available in appliance compartments becomes more restricted, particularly with the deployment of Positive Pressure Ventilation Fans (PPVs). A typical portable pump performance is rated at 800l/min at 5 bar and capable of 1400l/min at 3 bar, but is contained within a 520 x 490 x 584mm envelope.

There are also the forthcoming European prEN standards for portable pumps to be considered, these primarily address health and safety aspects as well as important pump features, such as operator controls and instrumentation.

Although lightness and compactness are high priorities, durability and a high build quality are not to be compromised. Features such as wrap-around stainless steel frame and corrosion protection for all parts in contact with petrol, grease and water are essential. The power source for a portable pump is typically a lightweight petrol or diesel engine, reliable, air-cooled, 18 BHP overhead valve engine, which is quiet, yet powerful. Servicing of the pumps should be straightforward and all the necessary spares inexpensive and readily available. The Manufacturer's warranty is expected to be at least 12 months duration.

Safety is, as always, a high priority with particular attention focusing on the engine exhaust. If possible, this must be fitted with a guard to protect the operator from high temperatures. An easily accessed fuel shut off valve should also be fitted to provide a quick and safe method of stopping the unit and containing the fuel. Carrying handles attached to the frame are considered essential. The option to fit wheels to the pump frame is a simple way of improving portability. Certain models incorporate engine oil cooling to safeguard the engine in prolonged use.

Priming systems are an important consideration. Pumps are now available with piston prime, hand prime or the long established exhaust gas ejector system. With the use of vacuum and pressure gauges to guide the pump operator, quicker priming and more efficient pump operation is possible.

In addition to these features portable pumps are now able to incorporate features such as electric starting, vacuum and pressure gauges and lighting. The 12 volt battery system can provide the power for a lighting mast and tachometer.

In the not too distant future portable pump design and manufacture will be subject to the European standards devised by the CEN (Comité Européen Normalisation). A technical committee, CEN/TC 192, comprised of leading European pump manufacturers has been devising these standards, currently defined as prEN 1028. The definition of a portable pump is defined as – "Portable pumps are motor pumps designed for fire-fighting which can be transported by hand to the site of operation and which are driven by a combustion engine. Portable pumps are intended to be not permanently mounted in fire-fighting and rescue service vehicles. This European standard deals with significant hazards, hazardous situations and events, arising from portable pumps used as intended or arising from conditions foreseen by the manufacturer or the manufacturer's authorised representative. It addresses

Picture courtesy of Hale Europe

the construction, setting, and operation of the portable pump."

The CEN standards documentation then proceeds to list the safety and protective measures required, these are some of the salient points –

5.1.2.1 Transporting devices and loss of stability

The portable pump shall have carrying handles or an adequate frame design to transport it according to the manufacturer's manual. The handles shall be designed to withstand at least 2.5 times the mass lifted divided by the number of carrying handles

Another area addressed is the capability of the pump to operate on an incline –

5.2.5.1 Inclination during operation

At nominal delivery rate the portable pump shall be fully operational in all directions up to a slant of 15° from the horizontal.

Other sections cover –

5.1.2.3 Manual starting device

If a manual starting device is used it shall be safe from kick back. If a handle starting equipment is used it shall be according to EN ISO 11102

The noise factor is also addressed –

5.1.5.1 Noise reduction at source by design

The noise at the operating position shall be as low as practicable by design . . . EN ISO 11688-1 applies.

5.1.5.2 Noise reduction by protective measures

If it is not possible to achieve the noise reduction at the source by design methods, the manufacturer shall, whenever practical, equip the machine with devices such as noise enclosures, silencers etc.

5.1.6 Electromagnetic compatibility

5.1.6.1 General

Electromagnetic emission and immunity of the device shall be controlled so that it poses no threat to the surrounding environment, furthermore the device must be immune to the environment it has to function in.

5.1.6.2 Radiated emission

The device shall not interfere with any radio reception in the vicinity of the device, as the operator of the device shall be able to get information regarding the operation.

The standard addresses areas such as the displays and controls –

5.1.83 All instruments shall be visible from the operator's position.

Manual controls and other operating devices shall be easy to reach and operate without unreasonable effort.

5.2.14.1 Operating controls

All operating controls shall be capable of being operated from one position (operator position).

An adjuster for the engine speed. Advice for stopping the engine. An actuator for suction (if required). A cold start device (if required).

The fuel system for the pump must provide sufficient fuel for one hours running at the rated delivery performance –

5.2.11.1 Independent operation

Independent operation at nominal delivery rate shall be ensured with a permanently installed fuel tank for at least one hour.

The maximum weight of a portable pump is defined as –

> The maximum mass with the engine fully operational . . . shall not exceed 200kg
>
> The unit is required to be fully operational from a cold start

5.2.6 Cold start

The engine shall be capable of operating under full load immediately after starting from cold conditions specified in EN 1028.

The standards also extend to cover the documentation that should be supplied with each pump, the instructions must cover transport and storage, description of the pump, commissioning, startup, operation and shutdown. The instructions must of course cover maintenance, servicing, faults, causes and remedies.

Of course, a great number of these points are already being addressed by pump manufacturers as an integral part of a continuous product improvement policy. It is essential for the pump manufacturer to consult the end user from the early stages of new product development to ensure the pump meets, and where possible, exceeds the fire-fighter's requirements.

The performance and standard of portable pumps available for fire-fighters continues to improve mainly due to the combination of customer's expectations, competing manufacturers and the introduction of exacting European standards.

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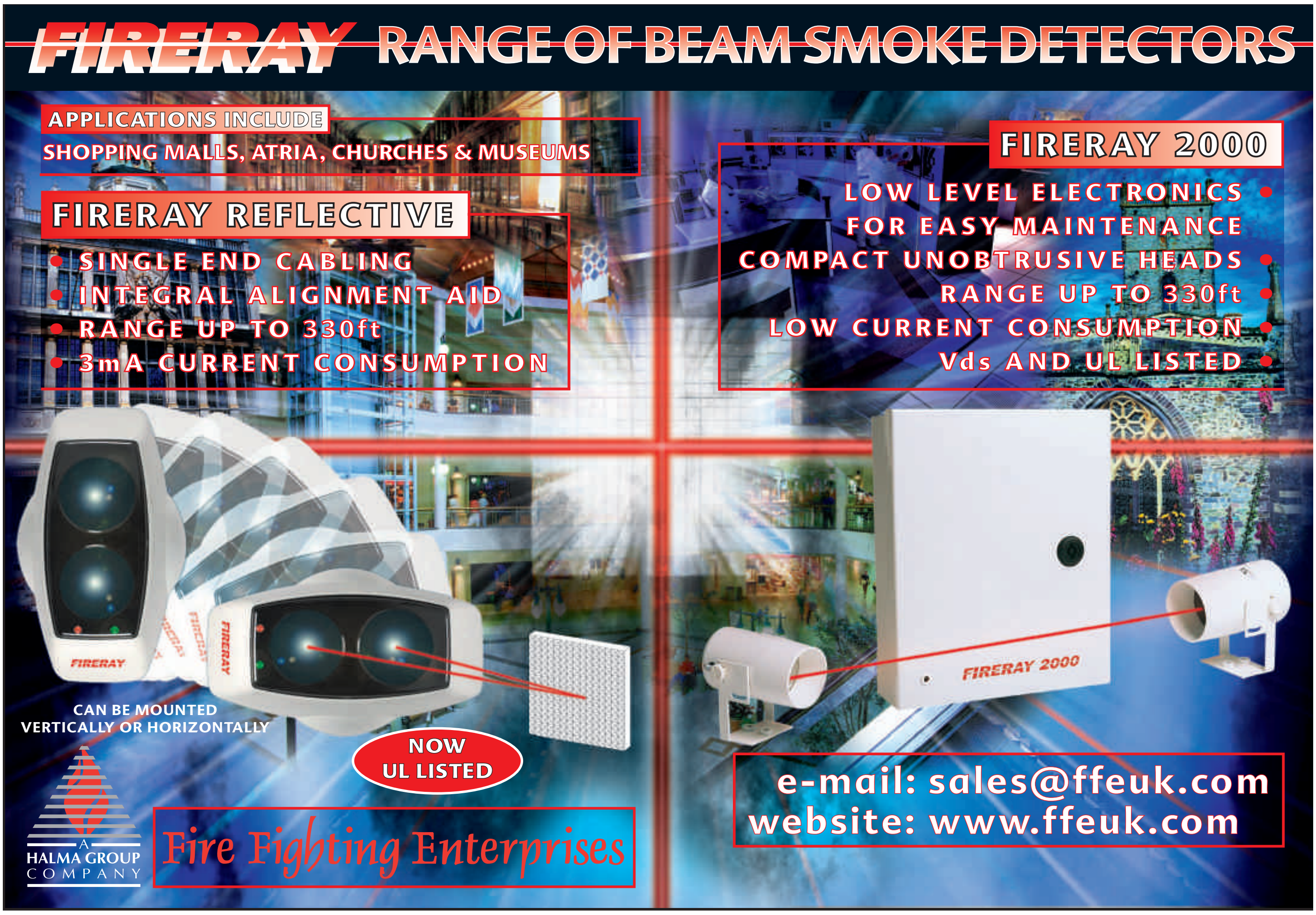

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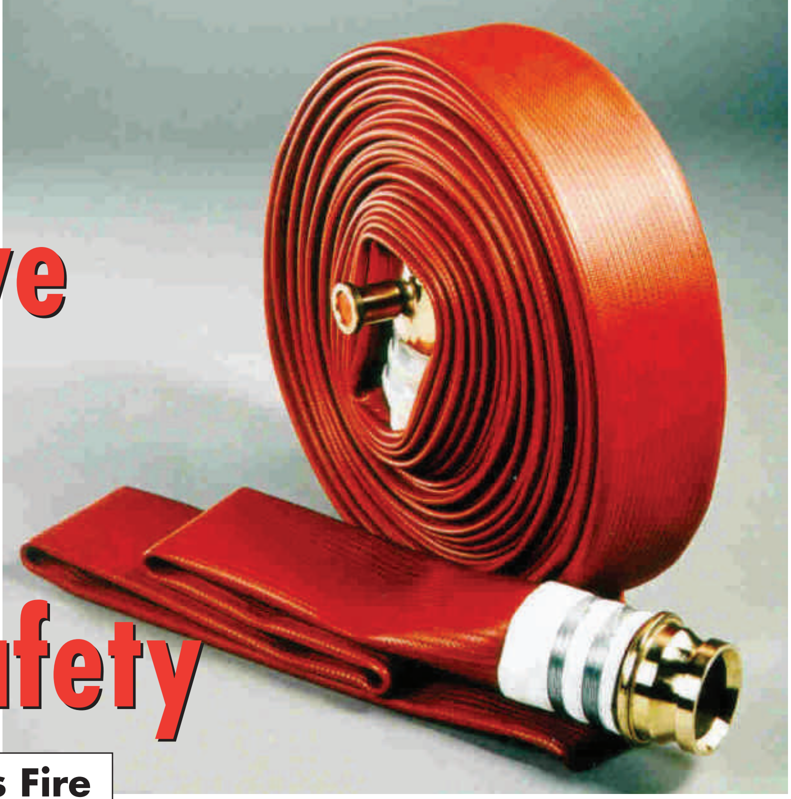
Choosing the most effective modern fire hoses for firefighter safety



Angus Duraline

by Charles Boon of Angus Fire

Today's firefighter is faced with not only a bewildering array of fire hose types but also many different quality levels. To find our way around this maze we need to better understand the key performance indicators when choosing a fire fighting hose.

There are several different types of fire hose in use around the world today.

CONVENTIONAL HOSES

These are the most basic hose type where a textile jacket containing the pressure has an internal lining to prevent water leaking out, but either has no exterior protection at all, or just a thin coating (usually red polyurethane) which offers little protection. Conventional hoses still represent the primary type of fire fighting hose used in much of the developing world.

DOUBLE JACKET

Another variation of this old conventional type hose has a second protective textile jacket over the inner jacket and lining. This is called "Double Jacket" hose, and is still commonly used in USA and US influenced markets. The outer jacket is designed to protect the inner jacket during use, however the result is hose that is very heavy (especially when wet) and not very maneuverable.

Such old style conventional and double jacket type hoses require considerable maintenance after use. They need regular cleaning and drying, often for several hours before being stowed away for future use. This usually leads to the need to for additional backup stocks to cover these maintenance periods.

COVERED HOSES

In contrast, these old style conventional and double jacket hoses are rapidly being replaced by maintenance free, lighter, wipe dry modern *covered type* hoses, which are already the most common type of fire hose in high risk oil and petrochemical industries.

The primary method of construction for covered hose is the so-called extruded or "through the weave" method which has a textile jacket for pressure retention, woven to allow the cover material to be extruded through the jacket to form an integral lining and cover in a single operation. This generally produces a very tough and durable hose.

KEY PERFORMANCE INDICATORS

To assess the operational performance of these hoses we need to delve into the basic components of the hose itself, look at the construction and the materials used to see how these will affect long-term performance.

To do this we can isolate five key performance indicators against which a hose must rate highly to achieve optimum performance. These are:

Abrasion Burning Embers Kinking
Oils & Chemicals Weathering

For each indicator we can rate each hose, and the more stars achieved the better. We can then give an overall assessment of suitability to meet these key performance indicators. Only hoses with consistent high performance across all 6 categories will be capable of meeting the demands for reliability and durability in use. Remember such performance may come at a price but we are talking about the lifeline of a firefighter. Lives could be at risk, so making the correct decision is critical.

CONSTRUCTION IS THE KEY

The construction and materials of the hose need to be carefully selected to offer good performance in each category and hence deliver a long working life. With budgetary constraints common, hoses are understandably being expected to last longer, resist contact with more hazardous chemicals, increase operator safety and consistently perform to a higher standard.

Lets briefly look at how the choice of materials and construction method can influence the key performance indicators of any hose.

Indicator 1: ABRASION

To assess this feature we have to simulate a working hose full of water at 7 bar g. pressure, by using a mechanical abrasion machine as already incorporated in the British and other international standards. The more strokes of the machine the hose resists, the better its resistance to abrasion. A high performance hose should resist over 125 double strokes.

Conventional type hoses suffer poor performance in this area, surviving typically 50 double strokes since the jacket yarns holding all the pressure are exposed to abrasion from the moment they are used, damage here from day 1 starts weakening the hose.

Double jacket hoses are well protected by a second jacket that can wear into a hole before the inner jacket is at risk. They will perform very well in this area.

Covered hoses have a resilient rubber cover to be worn away before the textile jacket is even exposed, so they generally score highly in this criteria, depending on the blend of PVC/Nitrile rubber used and the jacket material selected. When the cover is chemically bonded to nylon jacket fibres it resists abrasion damage well with 190 double strokes achievable without burst, but where polyester yarns are used poor cover adhesion may result in the rubber being "rolled off" the jacket with only 50 double strokes being recorded.

The material of the conventional type jacket is often polyester and sometimes cotton or indeed a mixture. Double jacket is very heavy and consequently more prone to kinking than other hose types, which can lead to further damage.

Indicator 2: BURNING EMBERS

To assess this indicator British Standard BS6391 uses a red hot metal cube heated to 600°C, which is placed on the hose containing water pressurised to 7 bar g. pressure. The longer the hose resists bursting the better its resistance. A high performance hose should be capable of resisting a burst for over 35 seconds.

Conventional type hoses suffer poor performance in this area, since the jacket yarns holding all the pressure are exposed to the burning embers with no protection. The man-made fibres have poor heat resistance and will fail in 2-3 seconds, yet the cotton or flax yarns will resist heat marginally better for maybe 4 seconds.

Because *Double jacket type hoses* have a second jacket they will resist damage longer but probably no more than 10-15 seconds.

Covered type hoses vary significantly in their performance depending on the rubber mix of the cover. The more nitrile present the better the hose resists hot burning embers to exceed the 35 seconds. More of the cheaper PVC additives to the cover reduce resistance to only around 12-15 seconds.

Indicator 4: KINKING

Kinking is a very important indicator often under-rated by firefighters around the world. Not only does kinking lead to reduced flows, which in turn can lead to increased pressure losses along the hose, it also greatly increases the risk of burst from abrasion at the kink point. Dragging *any* hose on a kink point dramatically increases the pressure loading at that point which can create a kink burst in a matter of seconds.

Hose jackets made from polyester yarns will kink to a much greater extent than those made from nylon (due to the extension characteristics of the material).

Conventional and double jacket type hoses are always made from polyester increasing their susceptibility to kinking.

Covered hoses can be manufactured from either material. However, by selecting a hose with an all-nylon jacket you are assured of minimising kinking and thereby maximising flow and hose life.

Indicator 5: OILS & CHEMICALS

Oil, acids and alkalis are common where fire incidents occur, even as breakdown products of the fire dissolve in water. Fire hose is also frequently exposed to pools of spilt chemicals during operational service in an incident.

Conventional and double jacket type hoses suffer poor performance in this area, since the jacket is exposed to absorption and attack by such chemicals. This may cause often-rapid deterioration in the jackets ability to withstand pressure, and can permit chemical attack of the lining, with swelling, weakening and lack of adhesion leading to premature burst.

Table – Comparing hose types

Hose type	Conventional		Covered	
Construction	**Single jacket**	**Double jacket**	**Extruded**	**Extruded**
Key Ingredients	Polyester/cotton jacket, rubber lining	Polyester/cotton jacket, rubber lining	All Polyester jacket & High PVC rubber	All Nylon jacket & High Nitrile rubber
Indicator 1: **Abrasion**	0	0000	000	00000
Indicator 2: **Burning Embers**	0	000	000	00000
Indicator 3: **Kinking**	00	0	0	00000
Indicator 4: **Oils & Chemicals**	0	0	000	0000
Indicator 5: **Weathering**	0	000	00	0000
Meets Key objectives?	◆	◆	◆	❖

KEY	0 = Poor	00 = Fair	000 = Average	0000 = Good	00000 = Excellent
Meets criteria	❖ = YES	◆ = NO			

Only *Covered type hoses* with a rubber cover will protect the jacket fibres from contact with these chemicals. However, even with this type of hose it is critical to demand a product with latex impregnated pinholes.

Indicator 6: WEATHERING

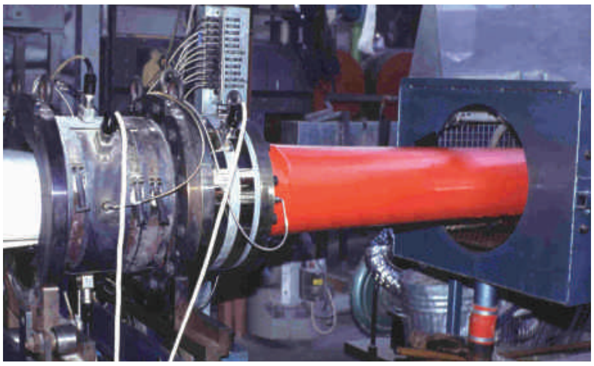
Outdoor exposure to the weather can lead to deterioration of rubber compounds so that the rubber hardens and cracks can appear, severely reducing its flexibility and impervious properties. Cracking is largely attributable to Ozone attack in the atmosphere.

Conventional and double-jacketed hoses have no cover to be attacked, but ozone will attack the rubber linings particularly at stress points and lead to cracking. Most rubbers are susceptible to this attack, which will reduce the life of the hose.

Having a thick rubber cover exposed to the atmosphere, *Covered hoses* are at greater risk of attack. The compound formulation is the key to ozone and ultra-violet (UV) resistance. Many covered hoses use a high percentage of PVC and few if any ozone-quenching agents, so they can suffer cracking after just 5 hours of accelerated ozone-ageing tests. More typically the better covered hoses will withstand 70-80 hours of these tests. It is important to demand from any supplier proof that their hose can withstand an ozone test exceeding 500 hours.

COUPLINGS

There are a wide range of couplings in use around the Far East, from traditional National Fire Hose threads (NH) in USA, to British Instantaneous, German & Dutch Storz, and Japanese and Korean standards. Most types are available in light alloy for freshwater use, and gunmetal or red brass for hazardous environments where there is an explosive risk like Zone 1 areas/mines, or saline water conditions. European couplings normally have a hose tail with ridges upon which the hose is wired on to provide a strong and watertight seal. Always specify a long tail, as there is a larger area for binding and less risk of couplings working loose or cutting through the lining during stowage. Most American couplings use an expansion ring, which traps the hose between ridges inside the coupling and a copper ring, which is expanded under high pressure to grip the hose and prevent water escaping. Storz has the advantage of a wider size range than other types and is very popular internationally for larger diameter (100-150mm) High Volume relay hoses.



Here the cover and lining of a fire hose are extruded together to form the finished product.

CONCLUSIONS

The table summarises the indicators, and it becomes apparent that to purchase a hose that is both durable and reliable it needs to score highly in all 5 categories.

So we have identified extruded type covered hoses as the group most likely to meet our objectives, but how do we determine which in this group can meet the criteria and which cannot? Be assured there are many claiming to meet these tough objectives, yet few can actually deliver both reliability and durability or long life in service under widely varying conditions.

One route is to specify a Kitemarked to that meets the stringent requirements of BS6391 Type 3. In addition, an all nylon jacket will ensure the highest performance in terms of flow and kink resistance. Only such a hose will offer the essential long service life, durability and reliability to meet your objectives.

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BIG FIRE = BIG WATER

by ARTHUR CUENCA – Task Force Tips

Many times high fire loads encountered upon arrival quickly preclude the use of standard handlines for an initial attack. In these cases, the movement of water and the establishment of a solid, constant water supply become crucial. Fires requiring large quantities of water for suppression (a high critical application rate) will dictate the water supply and delivery operation from the initial setup. If a fire has burned past you on the fire curve, additional handlines may provide no relief. The commitment to use high flow portable monitors and truck mounted master streams (500 – 2000gpm) also comes with the commitment to supply the necessary water for continued operation. Keeping in mind these additional supply requirements, the use of portable monitors or truck mounted master stream devices can offer some of the following benefits.

- Higher initial fire flows and increased reach can offer improved firefighter protection by keeping either interior or exterior operations in a more tenable atmosphere while providing higher knockdown potential.
- In limited staffing situations, higher fire flows can safely be provided with minimal personnel. For flow-based operations, more GPM per person can be delivered than with any combination of handlines.
- A single line put in place with a portable monitor can deliver flows from 500 GPM up to 1250 GPM providing a wide range of options to meet changing fire ground conditions. The new lightweight features of portable monitors offer fast deployment and the ability to better utilize pump capacity and available water supply during initial attacks. Faster knockdown translates to an overall reduction in stress levels of attack personnel.
- A single large blitz line can have as much effectiveness as up to 5 handlines with hose and necessary support. This can amount to a large savings in time and resources.
  - Higher flow rates can translate to increased reach and better penetration than handlines.
  - These high flowing devices can support a more effective allocation of personnel resources on the fire ground and provide a single engine company with more tactical versatility.
  - Portable monitors can provide unparalleled safety in Hazmat and vapor mitigation procedures, exposure protection, and high flow foam applications with a self-educting master stream nozzle.
  - The "scale up" feature of a single line supply followed with a second supply line (either 2½″ or 3″) can be used for primary initial attack or upgraded to surround-and-drown defensive operations as required by command.

Even with all of the noted benefits of using high flow portable or truck mounted devices, successful suppression strategies often fail due to some of the following issues.

- Lack of training will always affect the procedures used in proper deployment, placement, advancement and operation of attack lines.
- Though 3″ lines are flexible and mobile, their flow rates are limited. The use of 5″ supply will provide high flows, but restrict advancement of the line after flow has been initiated.
- The idea is that these sorts of high flows and the associated devices are either unnecessary or unwise. Typically, for most calls this is true, but for the small percentage of fires that cause our largest dollar losses, low flow handlines normally are proven ineffective as the move inevitably is made towards defensive operations.
- Higher flows translate to higher nozzle reactions and a much heavier stream, which sometimes can create unsafe operations on the fire ground. Due to poor training, when required, tie down straps are infrequently used and the portable monitor is often placed in service well below the elevation safety stop pin.
- Improper or inadequate training on this type of attack can result in extensive water usage and potential collapse in the fire structure.
- The choice of supply line to the portable monitor will, in some way, affect its use. Portable monitor use will focus either on highest flows (up to 1250 GPM) through 5″ LDH lines, or on maximum maneuverability (up to 500 GPM) through 3″ lines.
- The perception is that these lines and associated streams are strictly for defensive situations.

By initiating an aggressive attack utilizing a pre-piped master stream device or a portable pre-connected monitor, you can attack the fire using your total capabilities. As long as the device and stream is carefully and accurately placed and personnel operating the devices are mindful of the method of attack being used, the results will typically be successful. If, on the other hand, all components of your high flow initial attack were initiated properly and the fire still surpassed your ability to suppress it, there was probably little else you could have done. Remember –

BIG FIRE = BIG WATER

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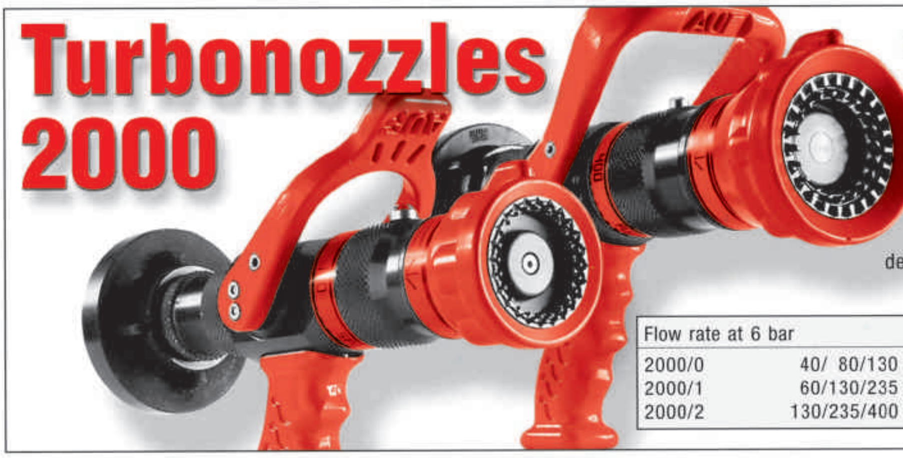

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carbon dioxide has safely extinguished more fire than any other gaseous extinguishing agent*

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Just as we accept the use of high voltage electricity in our homes and workplaces and the practice of flying 12km above the earth, so too carbon dioxide (CO_2) fire protection is engineered to high safety standards in protecting a wide range of industrial, commercial and marine risks.

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CO_2 FIXED SYSTEMS – A RESILIENT, VIABLE OPTION IN 2002

By **Doug Pickersgill**
Principal of Fire & Safety Systems (FSS)

10 tonne capacity, centralised bank of (low pressure) CO_2 used to protect #12 separate risks within an Electronics Manufacturing Plant in Taiwan.

AS A PARTICIPATING MEMBER of both NFPA2001 and NFPA750 Committees, I've been in close touch with the emerging new clean agents and water mist systems – in fact have used most of these technologies for our clients. However for someone who 'cut their teeth' on CO_2, it still gives me considerable satisfaction to see a well engineered CO_2 fire suppression system brought on line.

History shows there was the pre-Halon era when carbon dioxide (CO_2) was the primary flooding and streaming agent. Then with the introduction of Halons, CO_2 lost out to that panacea of extinguishants. Now with halons no longer acceptable for environmental reasons, CO_2 is enjoying renewed recognition and acceptance amongst the ever-increasing plethora of gaseous technologies and changing market needs.

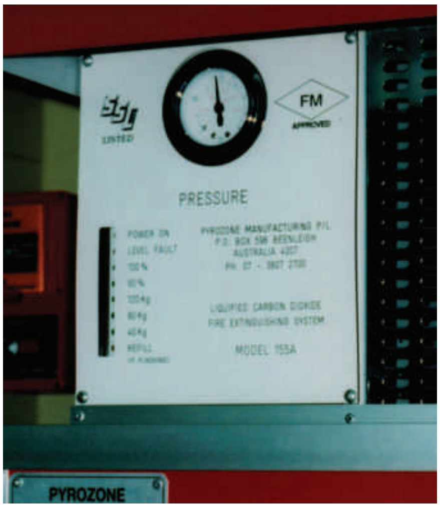
From a fire/risk engineering standpoint, I consider CO_2 to have the lowest 'prone to failure' rating of all the present options.

It is worth noting that investment in R&D of CO_2 system technology continues today. Companies of the standing of **Ansul**, **Pyrozone**, **Kidde** and **Chemetron** have released enhancements to both low pressure and high pressure programs, improvements that deliver measurable benefits in areas of safety, remote monitoring, (on-site) agent reinstatement and nozzle performance.

Whilst carbon dioxide is a Global Warming substance, as a fire extinguishant it rates favourably from an environmental perspective compared to the 'manufactured' alternatives, is clearly the most affordable and readily available agent and, in my opinion, the most 'predictable and forgiving' to apply.

Greatest resistance to its use stems from a concern for personal safety as at extinguishing concentration levels. It can be lethal!

Australian Standards, internationally recognised as amongst the better codes available in this industry, conducted a review of the CO_2 standard as part of developing a new suite of standards (AS4214), released in 1995, covering most of the clean agents developed to fill the gap left by Halons. That review resulted in several new requirements for CO_2 including the introduction of 'Lock Off' valves – effectively a fail-safe means of preventing or interrupting a discharge into any risk area. When combined with the improved detection, control and alarm systems now available, CO_2 can be delivered with levels of safety to satisfy most special hazard requirements – certainly for normally unoccupied risks where systems can be isolated for maintenance and other purposes.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Continuous 'fault' monitoring, including CO_2 contents, when reported to the F.I.P. and beyond, improves reliability and negates the need for regular surveillance.

Another safety related issue that must be addressed from the outset is providing for the removal of any CO_2 left in the risk or adjacent areas after a discharge. This particularly applies if there are basements, lift shafts or trenches where the heavier than air agent can accumulate to dangerous levels. The combination of a portable CO_2 'monitor' and permanent or portable air handling equipment will usually provide an effective solution.

It is interesting to note that by never embracing Halons Germany has continued to use CO_2 protection for a wide range of applications, including occupied risks. Their philosophy is based on fire community acceptance of disciplined adherence to – using only high quality 'approved' equipment; specific system design criteria, including time delays; use of certified installers; training of personnel in evacuation procedures; commissioning of systems before putting into use; and maintenance programs based on quality assured practise. There is no less concern in Germany for safety by OH&S underwriters or corporates – than in other countries, but they appear more adept at managing the risks to acceptable levels.

The British also have a fine record with using CO_2 – reflected in Section 3.2 of BS5306, which states – "the historical evidence from over 100,000 CO_2 systems installed in the past 50 years shows that CO_2 can be used safely".

Australia was the first nation to embark on Halon removal during the

CO_2 protection has been recognised throughout the world by traditional (high pressure) cylinder based systems.

1990's, resulting in only limited 'essential use' installations remaining today. This government-inspired initiative gave rise to a sea change in risk evaluation and engineering solutions for special hazard applications in particular.

Low pressure CO_2 technology emerged as a viable option for replacing many existing Halon systems due to its potential for re-using existing Halon 1301 pipework. This feature can underwrite significant cost savings by reducing or even eliminating down time for what are by definition, fully operational facilities.

In Australia we saw this technology being widely used to replace Halons for power generating and distributing utilities in particular to protect **turbines, switch rooms, control rooms** and similar **electrical risks** in network **substations.**

With the trend away from protecting computers perse and toward **mission critical equipment in** Internet service provider, telecommunication and other facilities, the versatility of CO_2 once again comes into consideration. One Australian manufacturer has pioneered the development of refrigerated **mini-bulk** storage of CO_2 in liquid form. This concept combines the best features of the larger bulk tanks (refilling in-situ, partial-multiple discharges, lower pressure) with the best aspects of traditional high pressure cylinder based systems (modular design, off the shelf packages, factory QA), resulting in a more user friendly format requiring less space and lower maintenance.

These more flexible systems are finding ready acceptance in **IT, semi conductor** and other **high-tech industrial** applications where large centralised storage systems are providing protection for multiple, decentralised risks up to 300m-400m away. No other gaseous technology offers this level of flexibility and performance.

'Thermal Shock', once a concern with CO_2, is not a threat to today's electronic equipment, which has the ability to withstand rapid temperature change and most other environmental demands. Also, improvements in nozzle design have reduced potential for 'dry ice' formation during a discharge through clever dispersement characteristics that prevent sublimation.

Carbon dioxide – 'the original clean agent', can be discharged without creating any expensive residual clean up problems. This characteristic when combined with its affordability and efficient on-site refilling, in the case of low pressure CO_2 equipment, allows the fire professional to conduct full scale commissioning tests. There is no substitute for a full-scale commissioning test – which will confirm, or otherwise, the integrity of the entire system – i.e. detection, mechanical, electrical, pipework, and the interface with air handling equipment. I never cease to be amazed at the number of systems that fail a preliminary test, even after thorough preparation, leaving me in no doubt as to the justification for recommending (to my clients and their underwriters) this 'added' expenditure!

Whilst 'total flooding' represents the majority of CO_2 applications, 'local applications', whereby the agent is trained onto a given risk, is a highly effective technique. This approach is widely used in the **automotive, printing** and other **processing industries** where stand-alone items of equipment or processes are not 'contained' within walls to allow flooding techniques to be adopted.

Given there is so much information and knowledge available on the delivery and extinguishing performance of CO_2, an experienced fire professional can employ this proven technology to obtain a variety of outcomes. We recently utilised the 'Open Pit' design guidelines contained in NFPA12 to protect two '**simulators**' housed in a large **training centre** – where pressurised hydraulic control lines pose a risk of fire should one rupture and flail fluid onto high temperature bearings. Through careful positioning and direction of nozzles it was possible to control the heavier than air agent to produce the desired design concentration up to a predetermined height – i.e. a theoretical ceiling level!

In addition to the applications referred to so far, there are much other Class A, B or C fires that can be addressed with either automatic or manual protection based on CO_2. These include **coal silos, quench tanks, semiconductor wet benches, computer room sub-floors, commercial fryers, spray booths, archives, MCC rooms, battery storage rooms, hose reel stations plus the traditional marine applications**, i.e. **engine rooms, cargo spaces** and **paint lockers.** Add to this, **inerting** applications and you have a truly versatile, proven extinguishant at your disposal.

Whilst presenting this commentary on the viability of CO_2 for today's market, we cannot overlook the importance of ongoing and regular maintenance of the completed installation. My consulting practice has invested heavily in the development of detailed maintenance programs for our clients as, without such programs, we could not justify recommending their original investment in high quality products, commissioning tests and staff training.

We recently implemented a maintenance program for Porgera Mines in New Guinea providing our client with daily maintenance schedules complete with question an answer/confirmation sheets for operators and covering every aspect of fire protection at this remote site. I'd like to tell you more about this program, maybe in the next issue of APF!

Doug Pickersgill was born in St George, Queensland, Australia. His entire working life has been spent in the fire protection industry starting as a cadet engineer with the Wormald Group in Australia. During a career spanning 40 years, he has lived and worked in Japan, USA, Mexico, Brazil and England where he was involved at the 'sharp end', developing innovative design philosophies and technical solutions to protect unorthodox and special hazards.

Continuous involvement with the Power Generating, Petroleum, Mining, Marine, Defence, Telecommunication and Transport industries has resulted in a unique understanding of risk management and loss prevention best practice across these areas.

Doug Pickersgill is credited with being one of only two non-US citizens invited to contribute to the development of NFPA2001, the most widely used standard covering the introduction of new 'clean agents' following the demise of Halon gases, and NFPA750, a standard dealing with emerging 'water mist system' technologies.

Doug Pickersgill is the Principal of Fire & Safety Systems (FSS), an Australian consultancy that attracts clients who are owners of high value and often unusual risks needing to be protected against fire, a challenge FSS thrive on. (www.f-ss.com.au)

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CUTTERS MARKET GUIDE

	AMKUS RESCUE SYSTEMS		HOLMATRO RESCUE EQUIPMENT			
Brand Name	AMKUS Rescue Systems	AMKUS Rescue Systems	HOLMATRO	HOLMATRO	HOLMATRO	HOLMATRO
Tool Model	AMK-25 Heavy Duty Cutter	AMK-25E Speedway Cutter	HMC 8U	HCU 3011	BCU 3010 GP	CU 3010 GP
Origin	USA	USA	The Netherlands	The Netherlands	The Netherlands	The Netherlands
Max. Working Pressure (bar)	724	724	720	720	720	720
Blade Opening (mm)	127	203	40	142	142	142
Cutting Performance: Round Bar (in mm, as per prEN 13204)			NA	24	24	24
Cutting Performance: Flat Bar (in mm, as per prEN 13204)			NA	60x5	60x5	60x5
prEN 13204 Classification			NA	AC116D-10,1	AC116D-14,4	AC116D-8,9
Weight ready for use (kg)	13.7	15.4	3	10.1	14.4 (Incl. battery)	8.9
Dimensions (mm)	521x229x193	597x229x193	320x75	645x205x170	659x305x230	602x205x168
Warranty	2 years	2 years	18 months	18 months	18 months	18 months
Notes	Capable of all automotive cutting requirements	Features long blade and wide opening for continuous cutting	For very confined, difficult to reach areas (pedals, steering wheel)	Hand-operated hydraulic cutter	Battery-operated hydraulic cutter for ultimate mobility: compact, lightweight, cordless	General-purpose cutter, first-line response

	HOLMATRO RESCUE EQUIPMENT cont.						
Brand Name	HOLMATRO	HOLMATRO	HOLMATRO	HOLMATRO	HOLMATRO	HOLMATRO	HOLMATRO
Tool Model	CU 3020 GP	CU 3030 GP	CU 3031+	CU 3035 GP	CU 3035 NCT™	CU 3040 GP	CU 3040 NCT™
Origin	The Netherlands	The Netherlands	The Netherlands	The Netherlands	The Netherlands	The Netherlands	The Netherlands
Max. Working Pressure (bar)	720	720	720	720	720	720	720
Blade Opening (mm)	147	180	306	237	144	281	180
Cutting Performance: Round Bar (in mm, as per prEN 13204)	28	26	32	32	25	35	25
Cutting Performance: Flat Bar (in mm, as per prEN 13204)	80x8	80x12	110x12	110x12	80x8	110x15	80x8
prEN 13204 Classification	AC134E-11,7	BC159F-11,9	BC191H-14,5	CC202H-14,8	BC151E-15,2	CC221H-19	BC166E-19,3
Weight ready for use (kg)	11.7	11.9	14.5	14.8	15.2	19	19.3
Dimensions (mm)	668x210x180	690x210x180	740x230x180	752x205x180	700x230x187	784x261x185	718x261x191
Warranty	18 months	18 months	18 months	18 months	18 months	18 months	18 months
Notes	General-purpose cutter, medium accidents, ideal to enclose profiles	General purpose cutter, medium accidents	Straight blade cutter, ideal for e.g. flat sheet metal	General purpose cutter, heavy accidents	Specially designed for cutting new hard vehicle constructions and materials	General purpose cutter, heavy accidents	Specially designed for cutting new hard vehicle constructions and materials

	HURST		
Brand Name	HURST	HURST	HURST
Tool Model	Challenge Cutter 200	Challenge Cutter 301	Challenge Cutter 330
Origin	USA	USA	USA
Max. Working Pressure (bar)	350	350	350
Blade Opening (mm)	125	140	221
Cutting Performance: Round Bar (in mm, as per prEN 13204)	dia. 28-30	dia. 30-32	dia. 30-32
Cutting Performance: Flat Bar (in mm, as per prEN 13204)	80x10	120x10	110x10 & 100x15
prEN 13204 Classification (Certification being prepared)	LHC 100 F	MHC 150 F	MHC 150 H
Weight ready for use (kg)	15.7	17.9	18.5
Dimensions (mm)	690x279x185	732x279x185	755x279x185
Warranty	2 years	2 years	2 years
Notes	Blades pull the material to the center of motion	Blades pull the material to the center of motion	Equipped with Top Grip blades

PETER LANCIER GMBH & CO. KG

Brand Name	**LANCIER**	**LANCIER**	**LANCIER**	**LANCIER**	**LANCIER**
Tool Model	S 90 LS	S 150	LHC 140-D	MHC 180-D	HHC 230-F
Origin	LANCIER	LANCIER	LANCIER	LANCIER	LANCIER
Max. Working Pressure (bar)	630	630/720	630	630/720	630/720
Blade Opening (mm)	105	150	140	180	230
Cutting Performance: Round Bar (mm)	22	25	22	25	32
Cutting Performance: Flat Bar (mm)					
Cutting Performance: kN	183	365	220	342	517
prEN 13204 Classification	no	no	D	D	F
Power Source	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Weigth ready for use (kg)	11.2	15.5	12	15.5	18
Length (mm)	610	685	615	750	710
Width (mm)	190	235	190	190	235
Height (mm)	180	220	180	220	220
Warranty (years)	1	1	1	1	1

Notes:

All LANCIER Rescue Equipment Tools are equipped with patented twist grip safety control with an integrated overload valve (no oil is spread into the environment), rubber protective ring. They are well balanced and due to the practical second handle they can be used in any working position without changing the position of the handle. With a cutting force of 517kN (630 bar working pressure) the hydraulic cutter type HHC 230-F is the strongest cutter in the market.

LUKAS HYDRAULIK GmbH & Co. KG

Brand Name	**LUKAS**	**LUKAS**	**LUKAS**	**LUKAS**	**LUKAS**
Tool Model	LS 131 EN	LS 200 EN	LS 301 EN	LS 330 EN	LS 330 FI
Origin	Germany	Germany	Germany	Germany	Germany
Max. Working Pressure (bar)	630 (+ 10 %)	630 (+ 10 %)	630 (+ 10 %)	630 (+ 10 %)	630 (+ 10 %)
Blade Opening (mm)	140	125	150	225	225
Cutting Performance: Round Bar (in mm, as per prEN 13204)	dia. 24	dia. 28-30	dia. 30-32	dia. 30-32	dia. 30-32
Cutting Performance: Flat Bar (in mm, as per prEN 13204)	60x5	80x10	120x10	110x10 & 100x15	110x10 & 100x15
prEN 13204 Classification	LHC 100 D	LHC 100 F	MHC 150 F	MHC 150 H	NA
Weight ready for use (kg)	9.7	11.7	13.9	14.6	17.6
Dimensions (mm)	563x171x145	663x190x163	705x190x160	726x211x163	733x210x195
Warranty	2 years	2 years	2 years	2 years	2 years
Notes	Equipped with LUKAS Top Grip blades	Blades pull the material to the center of motion	Blades pull the material to the center of motion	Equipped with LUKAS Top Grip blades	Completely current isolated up to 1000V AC resp. 1500V DC

ZUMRO RES Q

Brand Name	**ZUMRO**	**ZUMRO**	**ZUMRO**	**ZUMRO**	**ZUMRO**	**ZUMRO**
Tool Model	ResQ 120 Cutter	ResQ 160 Cutter	ResQ 190 Cutter	NT ResQ 241Cutter	ResQ 260 Cutter	NT Q-Cutter
Origin	The Netherlands	The Netherlands	The Netherlands	The Netherlands	The Netherlands	The Netherlands
Max. Working Pressure (bar)	350	350	350	350	350	350
Blade Opening (mm)	114	165	195	240	265	60
Cutting Performance: Round Bar (in mm, as per prEN 13204)	22	24	28	32	28	
Cutting Performance: Flat Bar (in mm, as per prEN 13204)	40x5	80x8	110x10	120x12	110x10	
prEN 13204 Classification	AC114C-13	BC 92E-9,5	BC 173H-13	CC203H18.5	CC227H-15	AC 60/A-7.4
Power Source	Maxi Power Unit	Mini/Maxi Power Unit	Mini/Maxi Power Unit	Mini/Maxi Power Unit	Mini/Maxi Power Unit	Mini/Maxi Power Unit
Weight ready for use (kg)	13.1	9.8	13.3	18.5	14.6	7.4
Dimensions (mm)	685x216x156	620x216x156	702x216x156	815x290x170	755x216x156	325x218x65
Warranty	2 years	2 years	2 years	2 years	2 years	
Notes	Medium duty cutter with traditional curved blades for A and B Pillar cutters	Ideal cutter and combi tool by fitting detachable jaws. Small & Compact for Confined Spaces	"The Best" Cutter for all jobs. Ideal handling & excellent cutting performance	World's strongest cutter with a unique overlap of the blades for continuous cutting	Medium duty cutter; ideal for impact free cutting & can be used as a Combi-Tool by fitting detachable jaws	

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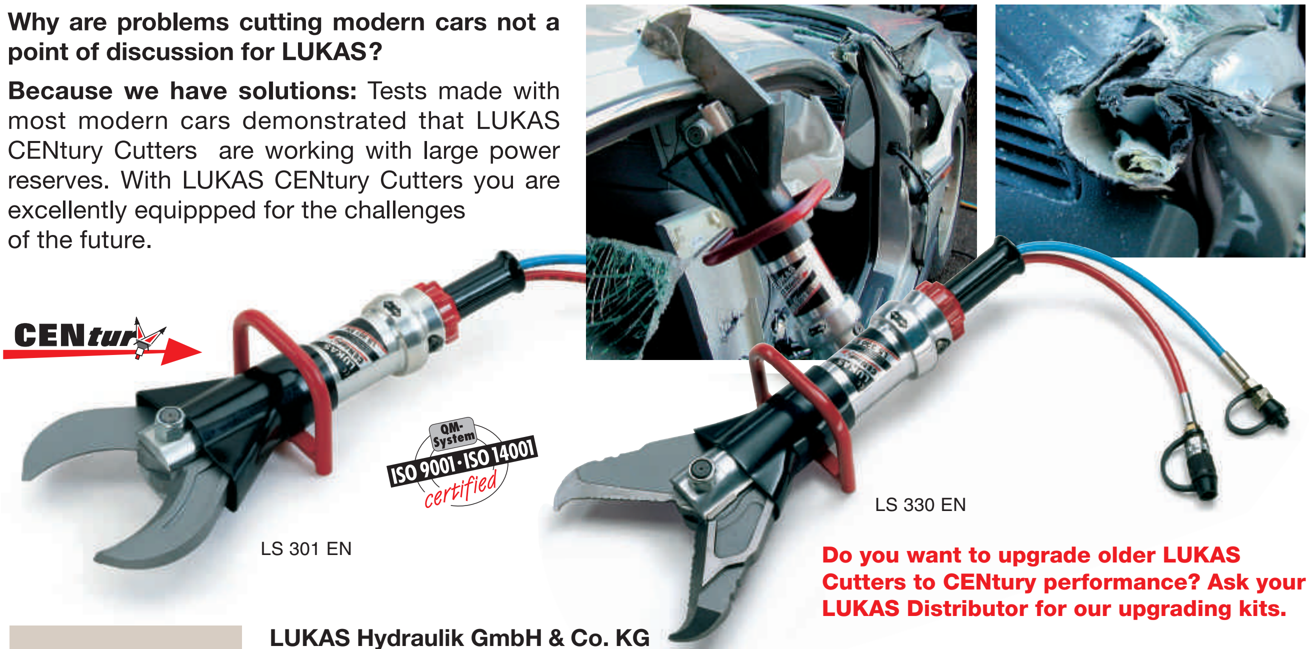

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Hub of the Far East

By Shelly Reese

Shelly Reese is a Cincinnati-based freelance writer and frequent contributor to NFPA Journal. This article is reprinted with permission from: **NFPA Journal™ (Vol. 95, No.1)** Copyright© 2001, National Fire Protection Association, Quincy, MA. All rights reserved.

To call the Hong Kong International Airport an airport is a bit like calling the Siberian Tiger a Cat or the Grand Canyon a Crater. It's technically accurate, but falls woefully short in capturing the project's scale and grandeur.

Hong Kong airport authorities, the Hong Kong Fire Service, and engineers worked hard to make sure that the 30 million passengers who pass through the airport every year are safe.

Built on reclaimed land off the remote Lantau Island, the Hong Kong International Airport (HKIA), which opened in July 1998, is a marvel in terms of both its scale and the traffic it accommodates. Named Asia's best airport by AsiaWeek magazine, the HKIA cost close to $10 billion (US $20Billion for all core projects of the new airport, including bridges and tunnels), and it took a full seven years to reclaim the land, design the structure, and build it. Today, the airport, which covers a sprawling 3,084 acres (1,248 hectares), is one of the busiest international airports in the world. Every day, 63 carriers operate as many as 460 flights, transporting some 84,000 passengers and 5,600 tons of cargo to 130 different destinations. In 1999 alone, the airport handled 2 million tons (1.8 metric tons) of cargo and 30 million passengers.

According to Mr. Kam Tak Leung, the Fire Standards Manager of the Airport Authority Hong Kong, massive quantities of materials were used in the construction of the passenger terminal and apron. The final count was 1.3 million cubic yards (1 million cubic metres) of concrete; 653,975 cubic yards (500,000 cubic metres) of flexible pavement; 110,233 tons (100,000 metric tons) of reinforcement; 63,567 square yards (53,150 square metres) of glass cladding; 1 million square yards (840,200 square metres) of ceiling and wall finishes; and 468,353 square yards (391,602 square metres) of floor finishes, not to mention 3,107 miles (5,000 km) of low-voltage cables and 249 miles (400 km) of piping. The terminal has more than 100,000 light fittings, 5,500 doors, 1.6 miles (2.5 km) of moving walkways, 92 lifts and 68 elevators, and 137,538 square yards (115,000 square metres) of carpet.

> *"Built on reclaimed land off the remote Lantau Island, the Hong Kong International Airport (HKIA), which opened in July 1998, is a marvel in terms of both its scale and the traffic it accommodates."*

Fire safety provisions in Hong Kong normally follow the Code of Practice for Minimum Fire Service Installations and Equipment, a prescriptive code issued by the Hong Kong Fire Services Department and the building authority. Performance-based design that provides equivalent protection is permitted in cases where the prescriptive codes are impractical, says Joe Kwok, the department's chief fire officer for protection, licensing, and control.

"The Hong Kong International Airport is the most prominent project in Hong Kong to adopt this design approach," Kwok says. "Owing to the unique nature of the building, direct applications of prescriptive codes are certainly not the best means to address fire safety."

Although the prescriptive code was applied to other facilities on the airport property, fire engineering design was used to develop a safety strategy for the massive passenger terminal and ground transportation centre. The design takes evacuation, compartmentation, fire suppression, and airport emergency management into consideration.

APPLYING INTERNATIONAL STANDARDS

Because Hong Kong is such a large international city, it recognizes a number of standards and rules from around the globe. As a former British colony, its code incorporates many elements from the Loss Prevention Council rules and British Standards specifications.

Still, "we maintain an open mind, and it's up to the design consultants to decide which approved standards they

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External view of Air Bridge.

Internal view of Air Bridge.

would like to adopt," Kwok explains. Consequently, the airport's fire protection plan incorporates elements from a number of standards. For example, the airport relies on Loss Prevention Council rules for automatic sprinkler installation, automatic fire detection systems, and automatic fire shutters. British standards are used for the manual fire alarm system, the audio and visual fire warning systems, and the street fire hydrant systems. The British standards and European codes are applied to portable fire extinguishers, and the Australian standard is the code for aspirating smoke detection systems.

NFPA codes are also becoming widely used, particularly for fire service installations and equipment, such as water spray systems, fixed dry chemical installations, and automatic total flooding systems, Kwok says. NFPA 2001, Clean Agent Fire Extinguishing Systems, was used to design the airport's FM200 system, which protects its plant and dangerous materials storage area. Designers also used NFPA 130, Fixed Guide-Way Transit and Passenger Rail Systems, to design a fire protection system for the automatic people-mover tunnel in the basement of the passenger terminal.

CABINS AND ISLANDS

While the protection system throughout the airport is comprehensive, the protection inside the passenger terminal is a particularly intriguing system based on a "cabin and island" concept. Although the protected building is enormous, the strategy, developed by a team from Ove Arup & Partners Ltd. led by Paula Beever, Ph.D., and worked into a design by an the engineering consortium Mott Connell Ltd., is relatively simple.

The cabin and island strategy seeks to harmonize the fire-safety planning in the building with the normal use and flow of people and to invest the money spent on fire protection where it can do the most good. "In large buildings, slavishly following the prescriptive codes is highly unlikely to achieve these aims," Beever maintains.

The safety strategy, which was also applied at Stansted Airport

> *"The protection system in the passenger terminal is equipped with two addressable master indicator panels and 30 addressable sub-indicator panels."*

in the United Kingdom and Kansai Airport in Japan, is based on the premise that an airport's large, open spaces are designed for the efficient movement of people. In addition, relatively higher fire loads in an airport terminal are usually found in well-defined shopping and concession areas. As a result, the strategy takes advantage of the open space by high ceilings where smoke would theoretically rise away from people in the general terminal area and using sprinklers and other controls to concentrate protection in high fire-load areas.

Sprinkler systems aren't provided in HKIA's general circulation and lounge areas in the passenger terminal. Because the ceiling soars to 98 feet (30 metres) in some places, smoke from a potential fire would rise away from building occupants, Beever says. What's more, "sprinklering the high roof would provide very little benefit, as the sprinklers would be high above any fire and, as a result, wouldn't operate until the fire became quite large," she says. Such a delayed response would be unlikely since the fire load outside the retail areas is generally low.

"The island concept simply recognizes that the distance between areas of high fire load may be great enough to avoid the risk of direct fire spread and preclude the need to separate the large space with fire-resisting construction," which would be incompatible with the building's use, she says.

The airport's 144 retail shops are sprinklered throughout the terminal in open "cabins" designed to keep smoke out of the larger area and to prevent fire spread. "The cabin is designed with a smoke reservoir at the ceiling to contain smoke by means of curtains, which will automatically drop into place when needed," Kwok says. "Sprinklers are fitted in the cabin to suppress a fire at its incipient stage. Inside the smoke reservoir compartment, a smoke extraction system, actuated by smoke detectors, is also installed to help disperse smoke generated from any fire in the cabin. Through this approach, the spread of fire and smoke can be checked."

Because the system's effectiveness depends on the airport's use, fire load, and other factors that could be altered over time, a chartered fire safety engineer in the Fire Standards Office sees to it that the protection standards adhere to the original performance-based design on an ongoing basis. The airport's fire engineering management team maintains the system, oversees alterations to it, and monitors any change of occupancy and fire load that might necessitate additional protection.

AN INTEGRATED SYSTEM

In addition to the automatic sprinklers, smoke reservoirs, detectors, and evacuation systems installed throughout the cabin areas of the passenger terminal, the various parts of the airport include a host of protection systems. Each of these systems was selected based on the fire load; potential hazards, physical space, and protected equipment in a given area. Collectively, Kam Tak Leung Fire Standards Manager, says the integrated systems represent "one of the largest fire protection systems in the world."

Fire Shutters in place at Airport.

Close-up of Fire Shutter.

The protection system in the passenger terminal is equipped with two addressable master indicator panels

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The integrated system meets a fire-zoning design and evacuation strategy. The design works on the presumption that a fire in the passenger terminal or ground transportation centre would affect a limited number of fire zones, but not the entire building. Thus, the passenger terminal is divided into 133 fire zones that can be evacuated individually. Upon activation of an alarm, all interfaced fire systems in the pre-defined evacuation zone are actuated. The alarm also actuates the audio and visual fire warning system, which provides a pre-alert message for adjacent zones and releases the electromagnetic locks on fire doors, allowing occupants to evacuate simultaneously if they are worried. If the affected zone is connected with other floors by an atrium, the zones immediately above and below it are also evacuated.

Four direct lines in the passenger terminal, one in the transportation centre, and one on the automatic people-mover link the system to the Fire Services Communication Centre. Two fire control centres serve the passenger terminal and the transportation centre. A fire workstation inside the airport operation control centre is staffed 24 hours a day to provide round-the-clock surveillance of the building's fire protection system.

> *"The fire hydrant and hose-reel system is designed in accordance with the Code of Practice prescribed by the Hong Kong Fire Services Department."*

SPRINKLERS, PUMPS AND HYDRANTS

Automatic sprinklers are also installed in the baggage hall, which includes the baggage handling and secondary sortation systems and the arriving baggage system in the 33-foot-(10-metre)-high area above baggage claim. The passenger terminal includes two separate systems. One protects the processing terminal, the north concourse, the south concourse, and the east hall, and the other protects the central concourse, the southwest concourse, the northwest concourse, and the west hall. The two systems consist of 154,345 sprinklers with 44 alarm valves, 3 pre-action valves, and more than 124 miles (200 kilometres) of pipe. A separate system protects the transportation centre. The systems use fast-response sprinklers and are designed to comply with the Loss Prevention Council's requirements for the OHIII (Special) risk category. This equates to a system discharge of 0.122 gpm, per square-foot (5-millimetre per minute) over 2,325 square feet (216 square metres), which lies between light hazard and ordinary hazard design criteria as specified by NFPA 13, Installation of Sprinkler Systems.

Two sets of sprinkler pumps and a jockey pump are provided for each system in the passenger terminal. The sprinkler pumps can provide 475 to 555 gallons (1,800 to 2,100 litres) per minute at 6 to 7 bars and are powered by a 43-kW, 83-amp motor. The jockey pump can provide 5 gallons (20 litres) per minute at 7.5 Bar and is powered by a 1.5-kW, 3.3-amp motor. Each system is also equipped with a 124 m^2 suction tank.

The fire hydrant and hose-reel system is designed in accordance with the Code of Practice prescribed by the Hong Kong Fire Services Department. Hose reels are spaced a reachable distance within 98 feet (30 metres), with the exception of some in the processing terminal that are extended up to 118 feet (36 metres) apart. There are fire hydrants for each staircase and at all gates. Two separate systems are provided for the passenger terminal. One protects the processing terminal, the north concourse, the south concourse, and the east hall. The second protects the central concourse, the southwest concourse, the northwest concourse, and the west hall. A third system protects the transportation centre.

The systems in the passenger terminal consist of 590 hydrant outlets, 170 fire service inlets, and 1,100 hose reels. There are two sets of fire pumps and a jockey pump for each system. The first system, powered by a 30-kW, 56-amp motor, has a fire pump capacity of 357 gallons (1,350 litres) per minute at 50 Bar. The jockey pump, powered by a 2.2-kW, 4.7-amp motor has a 10-gallon-per-minute (38-litre-per-minute) at 9 bar capacity output. The second system has the same capacity but is powered by a 45-kW, 83-amp pump motor. Its jockey pump has a 5-gallon-per-minute (20-litre-per-minute) capacity at 7.5 Bar and a 1.5-kW, 3.3-amp motor. Each system is equipped with a 387-square-foot (36-square-metre) suction tank.

The street fire hydrant system provides water from an external source for fire fighting along the perimetre of the building. Hydrants are placed at 328-foot (100-metre) intervals. Designed in accordance with the local Code of Practice, the system is fed from the potable water supply of a pressurized town main network. It consists of 58 pedestal street fire hydrants, each of which has a 1,057-gallon-per-minute (4,000-litre-per-minute) output at a minimum running pressure of 1.7 Bar.

SMOKE DETECTION AND EVACUATION

The roof of the passenger terminal is equipped with an aspirating smoke detection system, in accordance with Australian Standards 1670 through 1986. The system consists of 122 detector panels and about 3,000 sampling ports. These sampling ports are spaced a maximum of one every 1,076 square feet (100 square metres). The system sets the low alarm at 0.03 percent obscuration per 3 feet (1 metre) and the high alarm at 0.06 percent obscuration per 3 feet (1 metre).

A cold smoke purge system is designed to evacuate smoke from the building

after a fire has been extinguished and the temperature of the space has fallen below 154°F (68°C). The salvage system, which is operated manually from a control panel inside the fire control centre, uses the air conditioning system to purge smoke from the cavernous arrival and departure areas, passenger lounges, and dining areas, excluding the kitchens. Because the building is a glazed enclosure without window openings, the system allows for smoke evacuation after a fire. Using outside air, the system exhausts smoke at a rate equal to the normal air conditioning supply rate.

> *“Confining smoke within reservoirs prevents it from spreading into the open atria above platforms.”*

A hot smoke extraction system, designed in accordance with the local code, is provided for all open cabins, the baggage hall, the people-mover tunnel, and the airport express line platforms. The system works by containing smoke in smoke reservoirs, then evacuating those reservoirs through extraction grills high in each open cabin and replacing it with make-up air through the open cabin fronts. The smoke reservoirs consist of smoke curtains around the perimetre of each cabin that drop when a fire is detected. Ceiling voids also provide a reservoir. All cabin ceilings provide a minimum of 30 percent free area so that smoke can rise into the ceiling space.

SPECIAL CONSIDERATIONS

In the 495,140-square-foot (46,000-square-metre) baggage hall, a 33-foot (10-metre) ceiling creates an enormous space that’s vertically zoned into two principal areas. The baggage handling and sorting systems and the arriving baggage systems are in the lower two-thirds of the room. Above them are mechanical services related to the air conditioning of the processing terminal. Automatic sprinklers protect the baggage hall, and a fire shutter keeps smoke from passing into other parts of the building.

Designers used NFPA 130 in the automatic people-mover tunnel, where a driverless electric train transports passengers 820 yards (750 metres) between the east hall and west hall. The standard holds that airflow should keep the temperature of any smoke below 140°F (60°C). To comply with that standard, the airport relies on a smoke extraction system with a velocity of 2.2 yards (2 metres) per second to clear smoke. Smoke extraction is also provided for the people-mover platforms. Confining smoke within reservoirs prevents it from spreading into the open atria above platforms.

The passenger terminal also includes some 48 loading walkways, used to load passengers onto planes. Regarded as electrical and mechanical facilities rather building structures, the walkways aren’t fully glazed and aren’t under the jurisdiction of the building or the fire authorities, Leung says. The walkways consist of two sections, a fixed-linked walkway and a movable walkway. Floor-to-ceiling glass panels are provided on one side of the fixed-linked walkway.

With the exception of the glass panels, which are prohibited under NFPA 415, Airport Terminal Buildings, Fuelling Ramp Drainage, and Loading Walkways, the fire protection design of the loading walkways is in accordance with that standard. An addressable fire detection system is installed inside the loading walkways. The fabric on the loading walkway canopy is certified to meet NFPA 415, and the heating, ventilation, and air-conditioning system provides a positive-pressure atmosphere during passenger loading and unloading, allowing for the 5-minute escape time NFPA 415 requires. Made of non-combustible materials, the loading walkways are equipped with metal staircases that serve as fire escapes from the passenger terminal.

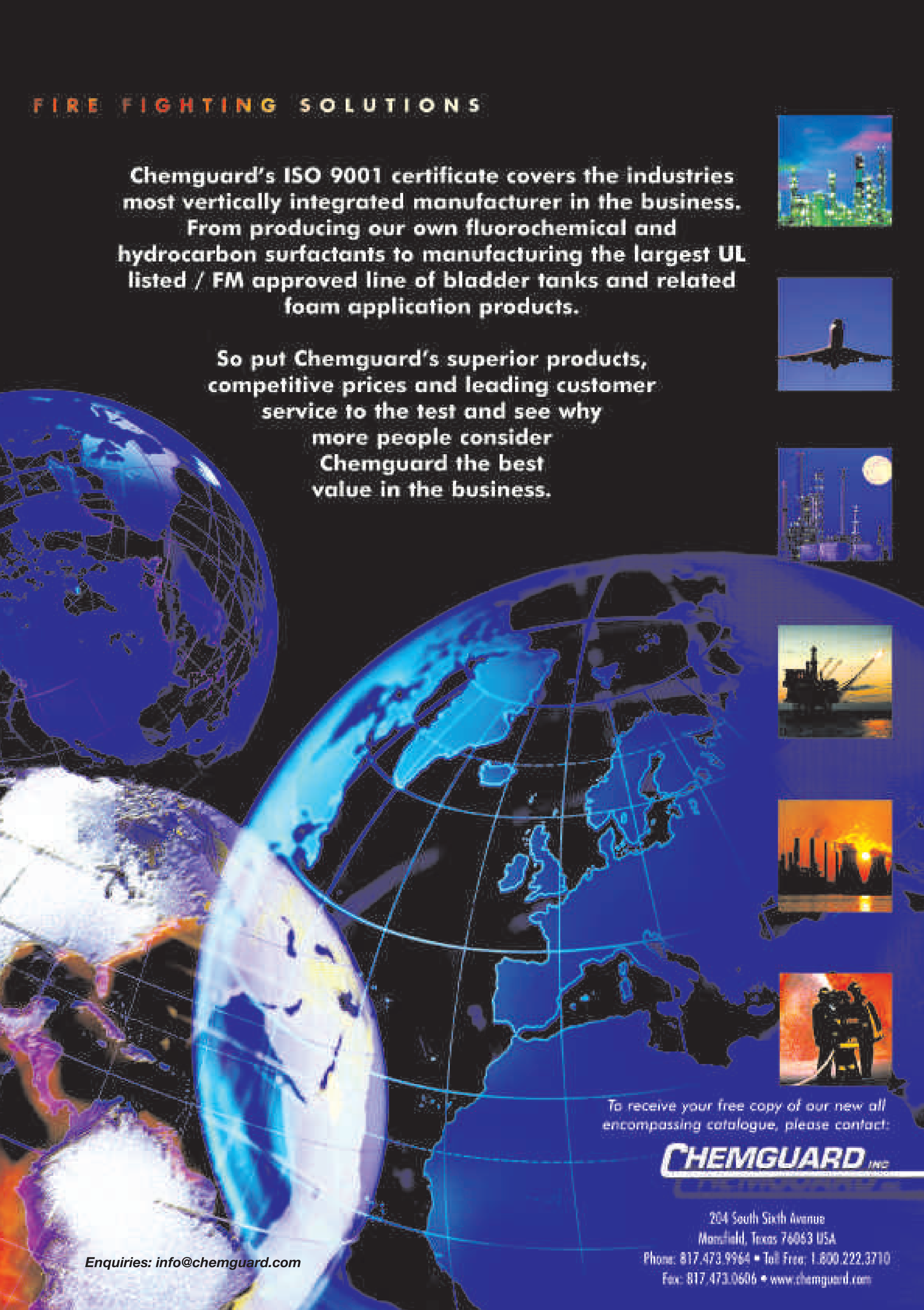
EMERGENCY OPERATION AND EVACUATION STRATEGIES

To contend with air emergencies, the Airport Fire Contingent (AFC) is provided with two airport fire stations, two sea rescue berths, and two boat-launch points within HKIA. The AFC is only responsible for aviation accidents, and their vehicles, vessels, and facilities aren’t intended for structural protection.

For structural fires and other special services on the airport, the Hong Kong Fire Service Department provides two fire stations. One is on the Chek Lap Kok platform; the other is at Tung Chung, near the airport. Both stations can provide fire-fighting services to the passenger terminal and the ground transportation centre within 6 minutes. The Chek Lap Kok fire station has 6 fire engines and 4 ambulances, and is staffed by 27 fire fighters. The Tung Chung station has 6 engines, 6 ambulances, and 34 fire fighters. Despite all the advanced protection devices in the airport, the Fire Services Department hasn’t forgotten the importance of old-fashioned drills. Both stations have rehearsed contingency plans in the event of a fire in the terminal.

No one likes to contemplate the possibility of an airport fire, and the authorities of HKIA are no different. Still, by contemplating various fire scenarios, the engineers, the Fire Services Department, and the airport authority of Hong Kong have helped ensure that a fire will be a challenge addressed appropriately by technology and teamwork, rather than a potential disaster.

For further details please feel free to contact: **Mr. Kam Tak Leung** via e-mail: **leungkt@hkairport.com**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Head USAR (Urban
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HEIGHT RESCUE

A DART MEMBER'S MEMOIR

SCRAPPING THE SKY OF SINGAPORE are many high-rise buildings where endless activities abound, both inside and out. While occupants go about their busy routines to meet deadlines in the offices within, work of a different nature takes place outside. Whether at buildings which are being constructed, or have already been erected and occupied, many building maintenance workers are required to work from gondolas suspended at great heights, or climb scaffoldings many feet above the ground. When accidents involving such cases occur, the consequences can be fatal. Hence men of the Disaster Assistance & Rescue Team (DART) of the Singapore Civil Defence Force (SCDF) are specially trained to conduct height rescue operations to save the victims of such incidents. DART consists of highly trained men tasked to accomplish difficult and complicated rescue operations. Given below are 3 real life examples when DART's timely intervention managed to save workers trapped in heights.

Height rescue operations

CASE NO. 1

On May 25, 1993, a man was left dangling from a snapped gondola eight storeys up in the air after it tilted suddenly. The only lifeline, which prevented him from crashing straight to the ground, was his safety line tied to the gondola. He was fortunately rescued by the DART, which sent 2 rescuers rappelling down from the rooftop of the 12-storey building. As horrified bystanders watched in cold panic, the rappellers first secured the man with ropes, then cut off his safety belt, before cautiously pushing him into the building through a window on the 7th storey.

CASE NO. 2

On April 4, 2000, the vertical boom of an operating tower crane collapsed suddenly and slammed onto the façade of a 12-storey building (which was under construction). This crushed a large portion of the scaffoldings, thereby seriously affecting the integrity of the whole scaffolding system. The impact of the boom hitting the building also flung one worker off the platform on which he was working. The impact caused him to fall onto the building's safety net, where he became trapped amongst a maze of broken scaffoldings.

The DART made a quick assessment of the situation before it staged a rescue operation from the rooftop. The

Picture courtesy of Singapore Civil Defence Force

HEIGHT RESCUE

A DART MEMBER'S MEMOIR

collapsed boom was first secured with a few 5-ton webbing slings to prevent it from collapsing further. When the rescuers managed to get to the casualty, they immediately secured him to a triangular seat harness. With a wizzer saw, the rescuers then cut away the scaffoldings under which the casualty was trapped. After this was done, the rescuers freed him from the netting, before the victim was hoisted away by a cableway system. Unfortunately he later succumbed to his injuries at the hospital.

CASE NO. 3

On July 27, 2001, a fire broke out on the 23rd-storey of an uncompleted 26-storey commercial building. In a moment of panic, two construction workers attempted to flee from the fire by climbing out of the window. They were stuck dangerously at the ledge of the building when the ropes they were using got entangled at the 21st floor. Trapped outside the building nearly 60m above ground, they frantically yelled for help. Fortunately for them, help did arrive. SCDF firefighters on arrival swiftly extinguished the fire in the building, while the DART sprang quickly to the aid of the two, trapped workmen.

At the 21st storey, one DART team broke a glass panel to create an opening from which rescuers could reach out to help one of the trapped workmen. Through this opening, the rescuers were in fact was able to pull him back into the building. The 2nd workman was out of reach for rescuers from within the building. Hence an external approach to the workman was necessary. 2 rescuers rappelled from the roof to the side of the stranded workman and safely helped him to re-enter the building through an opening on the 22nd storey.

Picture courtesy of Singapore Civil Defence Force

Height rescue – a dangerous affair

Behind the seemingly easy rescue operation in each of the above cases are actually many hours of hard training and practice. The DART reckons that such high angle rescues are inevitably the most dangerous endeavour among all rescue efforts. Any fall from height can result in serious injury or death, for both victims and rescuers alike. The DART therefore strongly believes in strict and dedicated training to sharpen its member's instincts, judgment and skills. In addition, DART also inculcates in its members a positive attitude towards proper equipment care, maintenance and usage. For when the crunch comes, the integrity of each and every single piece of the rescue equipment would matter. A frayed rope or a faulty karabiner can spell disaster if not spotted during maintenance.

Picture courtesy of Singapore Civil Defence Force

Continuous learning and enhancement

Over the years, building characteristics have changed tremendously. For instance, 10-storey buildings are no longer regarded tall. In general, high-rise buildings are progressively penetrating further into the skyline. This means that high angle rescue techniques employed yesterday can soon become obsolete or irrelevant in today's built-up environment.

Thus, DART pays constant attention to enhance its rescue capability. This is achieved through continuous learning of new skills and techniques, as well as acquisition of new equipment and new facilities built, such as rescue towers, which can inject realism in training simulation. Overseas courses have also been identified for rescuers to upgrade their high angle rescue and rope rescue competencies. These are some of the many steps taken to ensure that the DART can stay prepared for the next challenge.

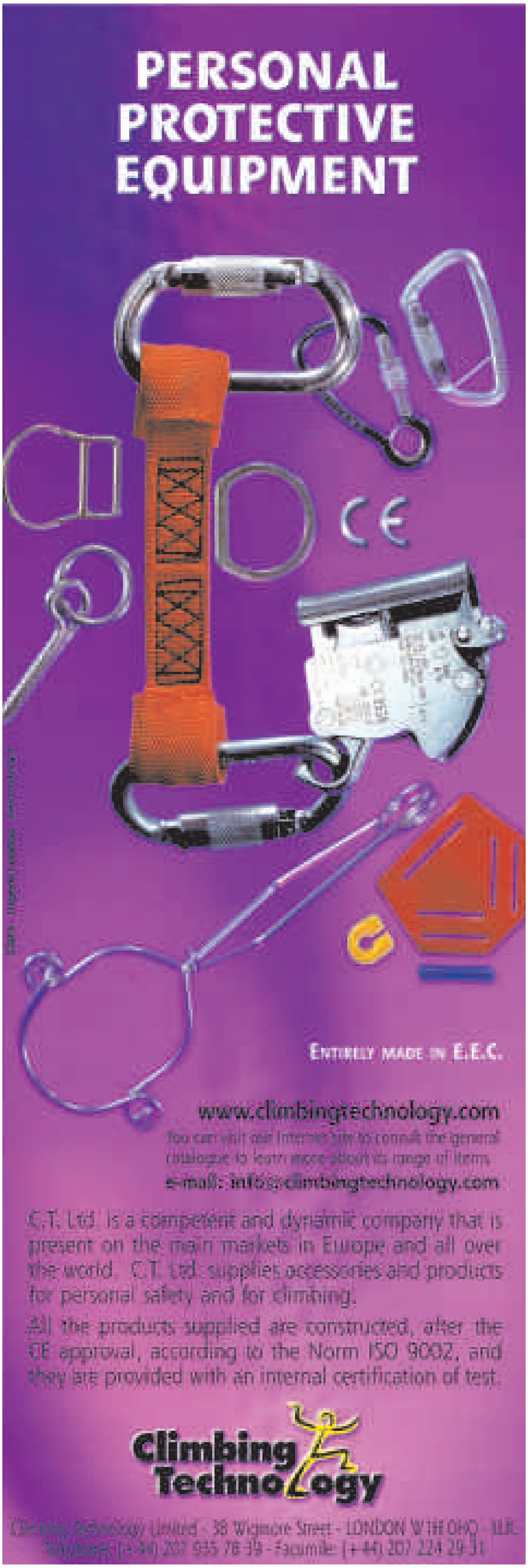
Picture courtesy of Singapore Civil Defence Force

Training

Since 1999, DART members have been sent to the UK for courses, which equip them with a higher level of personal proficiency in rope access techniques for high angle rescue. This is especially useful for complex and delicate situations, such as the case of a cable car accident, in which any careless exertion of force can send the cable car crashing down to the ground.

When the cable car is beyond the reach of an aerial platform ladder, or when the forceful "downwash" from the rotor blades of a helicopter may hamper a rescue operation, rescuers may need to rely on less bulky machineries such as a the 'Ram Pac' Pneumatic Launcher. Operated by compressed air, set at 13.5 bar (maximum), it can launch a rescue line up to about 90m away. With this handy equipment, rescuers can set up rescue lines between buildings for height rescue operations. Hooked onto these lines, rescuers can approach the stranded cable car, enter it and help rescue the victims one at a time. The victim may be too terrified to leave the cable car, but a skilful and experienced rescuer would be able to reassure him and swiftly strap him onto a safety harness and a safety line, which would be the passports to his ultimate safety.

> *DART pays constant attention to enhance its rescue capability. This is achieved through continuous learning of new skills and techniques, as well as acquisition of new equipment and new facilities built*



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In 2000, a team of DART members was sent to Adelaide, Australia, to attend a Rope Rescue Instructor Course. Over a period of 10 days, trainers imparted skills and techniques to build rescue systems to stage team-based height rescue operations. The course dwelled very much on the construction of various mechanical advantage pulley systems and understanding the belay system. The course also emphasized heavily on the need to be familiar with the rationale for the range of rescue procedures. The course was very beneficial. A number of the techniques learnt have been incorporated into the DART height rescue systems.

All knowledge and skills acquired from overseas are consolidated and studied comprehensively, for their relevancy and application in the local context and environment. Not every single system imported from the overseas courses can be readily put into local use immediately. They need to be carefully modified and tested. Once adapted, a training programme would be devised and the respective high angle equipment and accessories needed for training and operations would be procured.

Safety

SCDF takes high angle training very seriously, including the safety of all rescuers. The philosophy has always been for rescuers to “Be Safe And Not Sorry.” Before the commencement of any high angle training, all members are required to take a safety pledge. This is to inculcate a sense of good safety attitude in rescuers before they put their own lives at stake.

Rescuers are also required to ensure that they are properly geared, and that thorough inspection of all their equipment and accessories are carried out. After individuals checked their equipment, the ‘buddy system’ requires a pair of rescuers to countercheck each other’s equipment. This is followed by a final check by the safety officer.

Anchoring points are also important in height rescue training and operations. The rescue system must always incorporate a belay system or a belay line to offer 100% backup for the main system or main line respectively. All critical points in the system must be identified and made known to the rescuer performing the rescue for awareness.

Sharing Experience

No two rescue operations are exactly the same. Immediately after each rescue operation, an incident report would be put up for administration and to facilitate learning from experience. The team leader would conduct a sharing session, which is useful to all, including those who did not take part in the particular operation. This will ensure that no same mistake would be repeated and best practices are acknowledged.

Conclusion

Performing height rescue operations can save lives, but the rescuers will pay a high price if they are not well prepared, trained, and geared. Consistent training and always looking-out for new equipment and rescue ideas and methods, which evolve with changing threats and environment, are thus crucial.

Other secrets to successful height rescue missions include personal commitment to safety procedures and discipline of the highest degree, backed by the passion to save lives, all of which are the personal mettle of all DART members.

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NFPA and ISO Standards for Firefighter Clothing

By David Scott

Picture courtesy of Lion Apparel – Asia Pacific

HOW MUCH PROTECTION DOES A FIREFIGHTER NEED? In a life or death situation, a firefighter has to know his or her own limits and the limits of the equipment on which he or she is relying. For how many seconds will a suit protect a firefighter in a flashover? How resistant is a suit to certain chemicals? How tough do those gloves or helmets or boots need to be? Will a coat made of polyester melt? Are the equipment tests reliable?

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Currently, a group of standards-makers is trying to hammer out worldwide agreements on the quality of protective clothing worn by firefighters. The goal: one standard for every nation. The struggle to develop such a one-size-fits-all standard is Herculean in nature. On some points, agreement is close. On others, there are as many differences as Medusa had serpents.

Twenty-five nations are members of the International Standards Organization (ISO) Technical Committee on Protective Clothing. Another 16 nations have observer status. Basically, however, this is a tussle among three groups: ISO, the Committee on European Standardization (CEN), and U.S. standard developing bodies, such as the National Fire Protection Association (NFPA) and the American Society for Testing and Materials (ASTM).

Behind the standardization effort, which was largely a European effort until 1992, lies a quest for unfettered trade. The formation of a comprehensive plan for the European Economic Community in 1985 meant that minimum standards for were needed for European products as a basis for unrestricted trade between the member nations. To bolster trade, CEN standards for protective clothing were, and continue to be, developed to replace the standards of individual European nations.

Because ISO didn't have a protective clothing standard, CEN stepped into the breech. To speed the process and avoid duplication of effort, CEN and ISO made a pact, known as the Vienna Agreement, in which they agreed to develop standards jointly. The agreement basically says that if CEN takes the leads as a standard-maker, parallel ballots of approval will be taken in ISO. If ISO takes the lead, parallel ballots are taken in CEN.

While this process serves to reduce trade barriers in Europe, it's left the United States standards-development organizations at a distinct disadvantage. Until recently, they were seldom consulted in the international standard development process.

"From my experience, whoever starts with the first draft of a standard has management control over the standard development," observes Jeffrey Stull, the lead U.S. delegate to ISO, chairman of an ISO technical advisory group on protective clothing, and head of International Personnel Protection, a consulting firm in Austin, Texas.

Another mitigating factor is that each nation in ISO has just one vote. The United States may object to a draft standard, but its objections can be easily overruled by 15 European nations acting together.

Since 1992, the United States standards organizations have worked diligently to influence the direction of the international clothing standard, with varying degrees of success. One challenge is that U.S. clothing norms are often more rigorous than European norms. Partly, that's a reflection of what many consider a more aggressive approach to firefighting favored by U.S. firefighters.

"Europeans think our standards for firefighting clothing are overkill. But we won't allow significantly lower levels of protection," says Bruce Teele, NFPA's senior fire service safety specialist and its expert on clothing standards.

After years of disagreement, ISO has reluctantly accepted a draft of ISO 11613, a standard on firefighter clothing, which at this writing was awaiting a vote of approval. The compromise reached was essentially to provide two options. The first option, or ISO 11613 Part A), is European Norm 469. The second choice, Part B, is basically NFPA 1971, Protective Ensemble for Structural Fire Fighting. Each has separate testing, performance, and design requirements.

"Fire departments can decide which they want to follow," says David Matthews, the United Kingdom's national health and safety officer for the firefighters union and convener of an ISO subcommittee on fire protective clothing. "Some British fire brigades may follow Part B and some U.S. fire departments may follow Part A, if there are no legal restrictions to prevent them from doing so."

One of the differences between Part A and Part B is that the European standard has different levels of protection between coats and pants.

"We've learned a lot from U.S. clothing standards, but many of our firefighters aren't willing to accept the weight of clothing used in America," says Matthews. "With the materials we have today, it doesn't have to be as heavy. Heat stroke is a big issue for firefighters."

The expectation is that this draft is an interim step. Eventually, it's ISO's hope that one standard will be developed.

"There's a lot of goodwill and good work going on," enthuses Matthews.

The ISO draft also contains a provision stating that when NFPA 1971 or EN469 is revised, the revisions will be automatically adopted by ISO. NFPA prides itself on its state-of-the-art standards, and, given the pace of progress to date, some are concerned that ISO may not embrace the next revision of NFPA 1971, due out in February 2000, rapidly enough.

Finding middle ground on ISO 11613 is only one of several challenges. Other contentious ISO issues revolve around testing methods and performance criteria. For example, clothing must meet an insulation test for minimum protection of a firefighter in emergencies. NFPA 1971 has a minimum requirement of 17.5 seconds without a burn injury. EN469 uses an equivalent test of only 9 seconds. Similarly, when testing the thermal resistance of materials, the U.S. procedure is to put a piece in an oven set at 260°C to see if the material melts or ignites. The European test is done at 180°C.

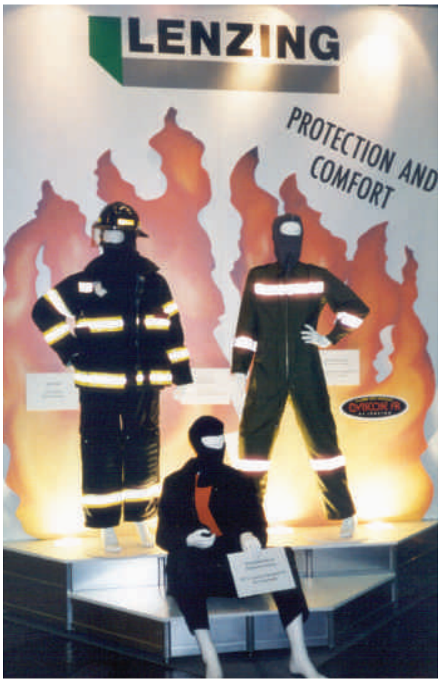
"We set our temperature higher to make sure that the clothing doesn't use polyester or nylon because it melts at lower temperatures," says Stull. "If a firefighter is exposed to a bad situation, we don't want clothing to melt onto his skin, making a burn injury worse."

The two sides may be moving to a compromise temperature of around 230°C.

Cost is also an issue, particularly for the European Community. ISO argues that the more thermally stable clothing materials, which are typically more expensive, aren't needed because European firefighting tactics are less aggressive than those in the United States. Less aggressive firefighting means less extensive personal protection. And because the European Community includes a range of nations at different stages of economic and technological development, European standards are often prescribed within a range. U.S. standards, on the other hand, set minimum levels of protection.

Take the case of the ISO standards being developed for gloves and wildland firefighter clothing, for example. The technical committees were able to harmonize the testing procedures, but they're setting multiple levels of protection. At the high end are NFPA standards; at the low end are European standards. European standards groups say that the range is necessary so that poorer nations can afford some degree of protection.

Yet another source of contention is test mannequins. In most countries, protective clothing is tested by burning of pieces of material to see how they perform during a fire. But in the United States, Canada, Switzerland, and England, mannequins are used to evaluate how a suit performs under extreme conditions as a system.



Picture courtesy of Lenzing AG

The test mannequin, first invented by **Dupont**, is covered with heat sensors, suited up and then exposed to flames and radiant heat to simulate flashover. A computer reads the sensors and provides a color picture predicting where and when an actual firefighter wearing the suit would have sustained second- or third-degree burns. Unfortunately, not all mannequins are created equal. Testing procedures and mannequin performance results need to be standardized. Another catch: Some of the ISO nations that don't have mannequins argue that the mannequin tests aren't as reliable or as useful as tests performed on scraps of material.

One of the driving forces behind the effort to develop international norms is the General Agreement on Tariffs and Trade (GATT). Each nation that signs it agrees to work toward lowering barriers to trade, whether those barriers be tariffs on overseas goods or local standards and testing procedures that effectively exclude foreign competition. The GATT stipulates that, when an international standard is available, signatory countries should follow it. The World Trade Organization (WTO), which oversees GATT, "is very keen to see ISO predominate over regional standards in the long term," says Matthews.

But GATT doesn't actually stipulate that ISO is the international standard. It could be argued, and may one day be tested in court, that NFPA standards are not only U.S. standards, but that they have enough followers worldwide to be considered international standards and, as such, that they meet the GATT criteria.

In an ideal world, a universal standard would make firefighters everywhere safer by raising the standards of poorer countries and making firefighter clothing cheaper as economies of scale lower production costs. If the end result of the ISO effort to develop a universal standard is to dilute or lower safety standards in the United States and elsewhere, however, there will be continued resistance.

"We're unwilling to sacrifice our minimum levels of protection to this effort," says Stull.

Community attitudes play a role

Fire departments the world over develop strategies and operating procedures that reflect the nature of the fire hazard in their communities, and the available resources dictate their level of intervention. Where fire protection is a key objective, reflected in community planning, regulations and building codes, and the use of automatic detection and suppression systems, severe fires should be the exception. Where a fire does occur, interior operations will probably be conducted when it's in the incipient stage, when danger to firefighters is moderate to low. Well-managed, highly trained, closely supervised, and properly staffed fire departments will perform effectively to minimize economic loss and will provide proper risk management to enhance operational safety.

Building construction can be an important factor in interior firefighting operations. Fires in compartmentalized structures of fire-resistive construction can be expected to be confined to the areas of origin or within a building compartment. When this happens, firefighters might allow the fire to burn itself out without direct firefighting intervention, restricting interior operations to protecting internal exposures and confining the fire to the involved compartment. These less-aggressive

Picture courtesy of Lion Apparel

firefighting operations mean that firefighters are exposed to less hostile thermal environments.

In communities where firefighting water supplies are weak, where buildings are relatively small and well-spaced, or where the fire department isn't well-organized, extensively trained, properly staffed or supervised, or properly equipped for interior firefighting operations, exterior firefighting operations may be effective, provided the fire department isn't expected to perform interior search and rescue functions. Such exterior operations don't require as high a level of protective equipment as interior operations do.

Where fire departments are expected to perform interior search and rescue operations and to minimize the economic loss by confining fires to the smallest area possible, firefighters can be expected to be exposed to hostile thermal environments. Protective clothing for firefighters performing this type of operation, which calls for an aggressive interior attack, should afford optimum protection.

In many fire departments, specific personnel are assigned to interior firefighting operations. Such departments should provide the interior attack team with a higher level of protective clothing than personnel assigned to other duties. Fire departments that require all firefighters to perform interior attack team operations at any incident or at any time during an incident should equip all firefighters with the higher level of protective clothing.

A firefighter's ability to judge heat build-up can depend on what he or she is wearing. What a firefighter may feel in one garment may be entirely different from what he or she feels while wearing another, so no single measure of heat build up can be applied to all protective garments. And it is not practical to rely on exposed body parts to indicate heat exposure, as human skin begins to burn at relatively low temperatures after a short exposure.

Some people feel that the thermal insulating properties of protective clothing causes heat stress, which may actually cause more injuries than lighter-weight, but less protective, garments. However, heat stress is not only a result of the garments firefighters wear, but also – and equally – by a number of other factors, including the firefighters' ages, physical condition, and metabolism, as well as the way in which they are managed and monitored during operations. Lighter garments may well help to reduce stress on the wearer, but they should provide the protection specified by the standard. And the fire department must address the entire spectrum of heat stress and stress-related problems.

A guarded, sweating, hot plate apparatus is used to evaluate the "breathability" of protective clothing composites. The criterion of W/m2 of heat transfer through the composite provides a value for comparing each fabric composite. The following points should be considered when evaluating heat loss through garments:

1 Differences in protective clothing materials are likely to have an appreciable effect on heat stress in mild and moderate environments and at low and moderate work levels.

2 In the most stressful high temperatures or high work rates, material changes are unlikely to make any significant improvements in tolerance time.

3 Thermal insulation is needed if garments are to protect firefighters from the hostile thermal environments. Garments alone cannot keep a firefighter comfortably cool and provide adequate thermal insulation for interior structural firefighting operations.

4 Means other than material specification should also be use to address heat stress.

When selecting protective equipment, fire departments must carefully review their needs and determine the appropriate level of protection. Purchase specifications should reflect these needs and specifically require compliance with the applicable standard. ISO DIS 11613 should not be construed as setting levels of protection for all firefighting situations and conditions to which structural firefighters may be exposed. Nothing should be construed as intending to limit or restrict any jurisdiction or manufacturer from the requirements.

Considerations for Evaluating Structural Firefighting Clothing

In understanding ISO DIS 11613, the ISO standard for firefighting protective clothing, several considerations are important. The standard is presented in two parts. Part A is based on the Central European Norms (CEN) document EN 469, while Part B is based on NFPA 1971, Standard on Protective Clothing for Structural Fire Fighting. These two parts represent similar yet different approaches for structural firefighting protective clothing, reflecting the fire experience and the firefighter death and injury histories of the communities that developed the two documents on which they're based. Both provide for firefighter protection, but each takes into account the fact that different fire-ground factors and different firefighting operations exist in various parts of the world.

However, one fact remains the same wherever firefighting operations take place: Firefighters who operate inside areas of a structure that are involved in fire or in areas affected by heat and products of combustion are exposed to a hostile thermal environment. These conditions can deteriorate rapidly when the volume of fire increases; when fire gases ignite in the structure, causing flame to roll along the ceiling and radiating high levels of heat; and when flashover occurs, igniting all combustibles in the area at once. Firefighters confronted with these conditions will face the same exposure, regardless of the type of building construction and general firefighting strategy – and no structural firefighting protective equipment can give prolonged protection from such hostile conditions. Certain injury, and quite possibly death, will occur if firefighters do not quickly extricate themselves.

The philosophy behind NFPA 1971 has been to provide adequate protection from the hostile thermal environment firefighters normally encounter during aggressive interior structural firefighting operations. This philosophy requires that both the protective coat and trousers, each of which affords the same level of protection, be worn, along with the other protective items, including a helmet, protective hood, self-contained breathing apparatus, gloves, and boots.

Of course, the length of time the protective clothing will afford protection varies, depending on the severity of the exposure environment. If firefighters quickly "knock down" the fire, the environment should improve and temperatures decrease. If a quick "knock down" isn't possible, the protective clothing may offer only a few minutes' protection before the heat the wearer feels through the garments becomes too intense. This may not allow firefighters enough time to complete the interior primary search and remove victims, then withdraw for an exterior operation or to a less hostile environment until conditions change. If conditions deteriorate rapidly during interior operations, there should be a short period in which firefighters can leave the area before their protective ensemble fails, making the incident survivable for the firefighter, if not for the protective garments. While the firefighter may sustain injuries, the level of protection garments that comply with NFPA 1971 afford will allow him or her to survive.

Bruce W. Teele is Senior Fire Service Safety Specialist in the Public Fire Protection Division at NFPA.

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NFPA 1981 2002 Edition vs. EN 137 Standards for SCBA Sets

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by Tony Pickett
Sabre Breathing Apparatus

LIKE MOST PRODUCTS that are sold in a global market, Breathing Apparatus have to meet certain standards and are subject to approvals. These standards and approvals vary from region to region but the two most widely recognised are those from Europe referred to as European Norm (EN) standards and the National Fire Protection Association (NFPA) standard as used in the US.

The following will address some of the most pertinent differences between the US standard, NFPA 1981 for fire-fighting breathing apparatus and European Standard EN 137 for self-contained breathing apparatus. There are slight differences between the two standards in aspects such as breathing machine rates used in the performance tests but these will not be discussed here, as the end result is very similar.

Although these standards are for similar types of equipment, used for the same types of applications, there are some significant differences that reflect the origins of each standard.

It is also important to understand the context within which the NFPA and EN standards were devised and enforced. The fire service in the United States is 70% volunteer / part-time in comparison to Europe's predominantly professional / part-time. European fire services tend to operate regionally and benefit from nationally regulated training programmes and procedures. In the US, fire departments are typically organised on a local basis and typically did not have nationally enforced regulations with regard to operational procedures.

NFPA Standard is not Federal requirement but insurance consideration. Fire fighting in the US is primarily driven by Insurance requirements to restrict property and personal injury claims. In UK the primary purpose is to safeguard life and as a second priority to restrict damage. These two approaches mean that the US fire-fighter puts him or herself at greater danger to fight a fire, in many cases from within a building. The UK approach is to fight the fire from the outside and only go into a burning building if life is threatened.

Consequently, historically, the equipment specifications for NFPA are deliberately more stringent, in recognition of the levels of training and control, and the likelihood of encountering extremely hazardous situations because of the invasive methods of fire-fighting used in America.

Furthermore, the concept of preventative and scheduled maintenance is less prevalent in the USA and has to be accounted for in the equipment design and specification.

In short NFPA is a standard that specifies many features that are

Picture courtesy of Scott International

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compulsory on a BA set whilst EN standards have less compulsory features but allow for additional features. If the BA sets have a particular feature then it must meet the performance standards that are laid down.

This allows European fire brigades to chose and specify the features that they need to fit in with their operational requirements whereas an American brigade will basically have to take a package containing everything as standard.

In September 2002, the new revision of NFPA 1981 comes into effect, which introduces some further requirements for SCBA not currently being considered by the CEN committee. However the latest draft of the European Standard for self-contained BA, EN 137 has now identified a new type 2 definition for SCBA used for fire fighting applications. This new Type 2 classification will require a flame engulfment test similar to that required for the NFPA 1981 specification. This standard is in the formal comment stage and is likely to be fully ratified late in 2002.

One of the fundamental differences between the US and European approvals is the need in the US to satisfy both an approval and certifying body i.e. NIOSH, who test to Federal regulation 42 CFR part 84 as well as obtaining additional qualification to the NFPA performance standard. NIOSH certification is required as a pre-requisite for NFPA approval. Looking at the new En standard a broad brush could be applied saying that the Type 1 apparatus tests are equivalent to Niosh approved apparatus with the type 2 sets being more equivalent to NFPA sets. The CE regime is considerably looser in comparison to satisfy the respective demands of the sixteen CEN member states.

Because of the NIOSH element of this process is it virtually precludes the approval of a European or NFPA configuration SCBA to the other standard as in certain areas the two standards are mutually exclusive. The best example of this is with regard to cylinder connectors, valve and shells. These must all be qualified to the necessary US or EN specifications, US sets for example must use CGA 346 and CGA 347 fittings for low and high pressure respectively whilst European sets have to use a threaded fitting complying with EN-144-2. The cylinder is an integral part of each individual NIOSH set approval and cylinders have to be purchased from the set manufacturer to maintain approval. It is therefore impossible to have a NIOSH/NFPA approved set that does not use and American cylinder and cylinder connection.

In order to highlight the principal differences between these two standards, the following provides a brief explanation of the actual requirements for each of the respective standards:

HEAT & FLAME RESISTANCE

There are two stages of heat and flame tests within NFPA 1981 standard, There is a heat and flame test on material used to secure the SCBA to the user and a complete flame engulfment test of a complete operating SCBA, whereas there is only one flame test currently required for EN 137.

EN137 is currently under revision with a new prEN137 undergoing formal comment. Within this new draft is a requirement for a complete flame engulfment test – similar to that required under NFPA 1981.

The flame engulfment test has received much publicity and debate of late, but with these changes to the European Standard, there will be no discernible differences in terms of product performance in relation to flame resistance between NFPA and EN sets.

The material heat resistance test in NFPA is also critical in meeting the material selection criteria. Swatches of the harness materials are placed in an oven at 500ºF for a short period of time. The only materials that survive this test are typically made from intrinsically flame-retardant materials such as aramid (Kevlar), Nomex or blends of similar type of materials. The disadvantages with these 100% Kevlar materials is that they are very expensive as well as having lower resistance to wear and abrasion than polyamide materials

Picture courtesy of Scott International

VISOR SCRATCH RESISTANCE TESTS

An additional test to meet the NFPA is a visor scratch resistance test where the visor is abraded and has to meet minimum levels of optical clarity. The test basically rubs wool felt polishing pad across the visor with a specified amount of force behind it, a specified number of times before the visor is tested by a machine to measure the amount of hazing.

The standard European EN 136 mask visors do not have to meet this specification, although visors with an NFPA specification can be fitted to the mask if required however this increases cost to the customer, as the NFPA visor is considerably more expensive due to the more complex and expensive coating process.

SECONDARY WARNING (EOSTI) DEVICES

NFPA has a requirement for two low-pressure warning devices on each

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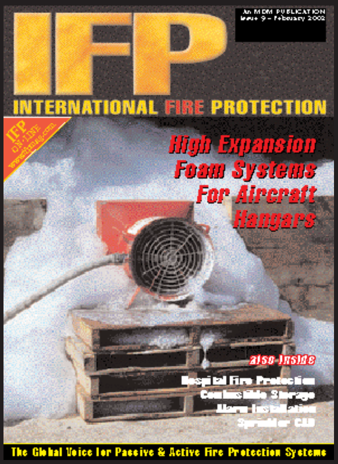

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SCBA. These must be entirely independent in operation and each must attract the attention of an independent human sense. Typical approaches to this are providing a visual indicator on the gauge, on the ADSU/PASS or in the facemask as well as a whistle. With the current operational procedures and controls generally employed within the UK and European markets, there is no discernible demand for such a device.

HEAD UP DISPLAY

A new requirement that is being introduced into NFPA standards is the head up display; this must show cylinder contents in at least 4 equal increments from full to ? full, a Numeric display alone is not acceptable. There are very strict criteria about the light levels that this head up display must be visible in, from the equivalent of full sunlight to very low light. This HUD could also fulfil the requirement for the secondary EOSTI above. There is no such requirement in the European standards for this although several manufacturers do offer such a device as an option.

VIBRATION TESTS

In this test a BA set is contained within an open topped metal box and shaken for 3 hours at 250 hertz. This is incorporated to simulate a BA set being left unsecured in a pick-up truck where it could roll around for prolonged periods of time between uses. This will mean that many loose parts of the BA set will require additional protection possibly making the set bulkier and heavier. The European standards have no equivalent vibration test to this, the assumption being that BA sets should be stored and secured properly in the fire appliances.

RIC Connector (Rapid Intervention Crew)

This is a fast-fill connector by another name. It will allow rapid charging of an SCBA while it is being used. This can be used for recharging a system or the decanting of air between one SCBA user and another. To do this, an appropriate charging hose also has to be provided. One charging connector is specified which operates at 4500psi. A resetting PRV is required on all units to ensure that over charging is avoided.

In the European standard this type of product is incorporated into an annex to the main standard so if it is fitted to an EN set then it must meet the relevant performance specifications but it is not compulsory.

CONCLUSIONS

Whilst comparing the two standards and looking at sets meeting each standard it is clear that most of the primary components of the EN137 approved apparatus i.e. facemask, demand valve, pressure reducer and whistle would pass the NFPA Standard and vice versa. Indeed manufacturers that operate in both NFPA markets and EN markets use near identical primary components on the versions of the sets they market in these different areas.

The incorporation into EN137 of the flame engulfment test for type 2 sets also mean that the materials used to fabricate the harnesses and backplates are of equal flame retardancy to those sets with the NFPA approval.

Because many manufacturers are now global businesses they have a commitment to satisfy the needs of a global marketplace and keep abreast of the developments in all markets. This global market experience is put to best advantage in terms of providing single product solutions that can address the needs of multiple markets. This leads to them developing common basic platforms, however, because of differing market structures and regulations, it is necessary to make superficial configurational changes to product to satisfy local market demands, whilst not compromising the desire to achieve the highest levels of performance. This common platform will therefore generally meet or exceed the basic requirements of most of the different standards throughout the world with the major product differences coming from the market specific additions.

Both standards make sure that manufacturers are making sets that will withstand higher temperatures than the person wearing them can take, provide more air than a human could possibly breath and will therefore provide the highest level of performance to the fire fighter. The different way in which the standards approach the choices that they give the fire brigades will generally mean that an NFPA set can cost 3 to 5 times as much as an EN set purely down to the compulsory features that have to be incorporated for this standard to be granted. With economic pressure becoming a fact of life for both fire brigades and industry alike we may over time see customers moving towards the lower cost option of the EN sets where presently both standards are accepted.

To complete the Jigsaw it is worth mentioning that work has just started on an ISO standard for breathing apparatus, this has the aim of creating one standard world-wide for BA with committee members coming together from Europe, Japan, the US and Australia. This will doubtlessly not be a quick process, it took many years for the European countries to agree before we got to the one EN standard, but in theory the best parts of each standard should come together allowing manufactures to produce one product that will be accepted world-wide.

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Product Manager –
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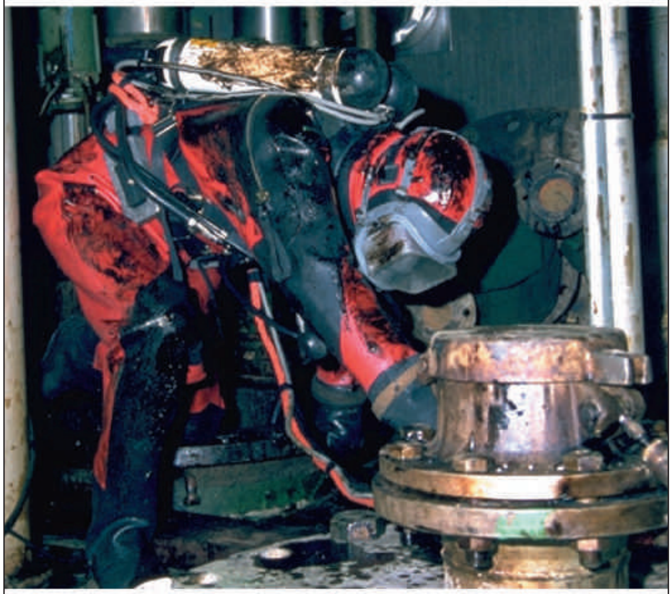

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Hughes Portaflex 300 Portable Decontamination Shower.

More choice for targeted solutions

by Tony Hughes, Managing Director,
Hughes Safety Showers Ltd

THE GROWING THREAT of terrorist action has added to the potential hazards faced by emergency services that may be called upon to decontaminate the public as well as their own personnel. Biological, chemical and nuclear contamination is not new and methods of dealing with incidents, whether they are the result of accidents or deliberate action, are well practised. However, equipment and techniques are constantly evolving to keep pace with new threats and changing conditions. Manufacturers now offer a wider choice of equipment with individual products developed for specific applications enabling them to deliver more effective treatment. Selecting the most appropriate equipment is therefore more important than ever.

The method of decontamination clearly depends on the circumstances. Techniques for dealing with the general public who have come into contact with a hazardous substance will be different to those used for decontaminating personnel wearing full protective clothing. The location of an incident, its severity and the numbers of casualties involved will also influence the choice of equipment.

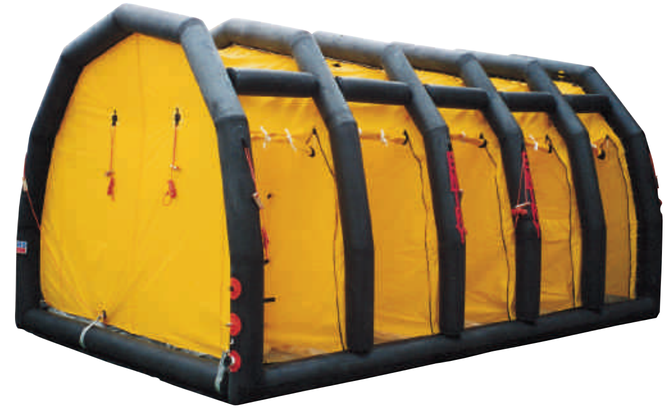
From a practical and cost point-of-view emergency services cannot carry every type of equipment so a risk assessment of potential hazards within the sphere of operation will help in identifying the type of decontamination equipment that is likely to be most effective.

Decontamination of people will generally be the result of either a local incident, involving small numbers of casualties, or a major disaster, possibly caused by an explosion or terrorist attack and involving large numbers of casualties. Both could involve varying levels of contamination. Some people may be able to decontaminate themselves by showering while others, on stretchers, will need treatment by trained personnel. Furthermore, decontamination can be carried out as a one, two or three stage process and within these there are options. On the two-stage process, for example, the latest thinking suggests that cool water followed by warm water is more beneficial for decontamination of people. Initial decontamination with cool water soothes the affected area and reduces percutaneous absorption of chemical through the skin. The use of slightly warmer water in the second stage is intended to reduce the shock and discomfort of the cool water.

The decontamination of personnel wearing protective clothing will vary according to the kind of work being carried out. Emergency services dealing with a chemical or biological incident will probably require different procedures to the military involved in the safe disposal of chemical weapons. Furthermore, some experts are now suggesting that the use of warm water and detergent can greatly improve efficiency when decontaminating protective clothing.

Often incidents and major disasters will involve both types of decontamination and the common requirement for equipment is speed of deployment. This needs to be achieved without compromising effectiveness, robustness and reliability – a balance that is foremost in the minds of equipment designers.

One of the most popular and widely used decontamination units is the inflatable shelter, which is the main product offered by many manufacturers. An inflatable shelter is portable and can be inflated in less than five minutes making it particularly easy to deploy. Inflatable shelters are mainly used for the decontamination of people who have come into contact with hazardous substances. It is not primarily intended for the decontamination of emergency service personnel who need



Hughes Cupola Decon 5 Rapid Decontamination Shelter.

to decontaminate their protective clothing prior to its removal.

An inflatable decontamination shelter can be used at the scene of an incident or disaster to decontaminate the general public before they get into an ambulance. This prevents them contaminating the ambulance and making it unsafe to use until it too has been decontaminated. Another typical application for an inflatable shelter is outside the accident and emergency department of a hospital to protect against the introduction of contaminants following an incident.

Although inflatable decontamination shelters from different manufacturers will vary, they all have a built-in sump to contain the washed off liquid. Then, depending on the contaminant, the sump contents can be discharged into the main drain system or collected for further treatment and safe disposal. Some units have simple inflated frames with straight sides, some have more sophisticated frames with an increased number of cross braces, and some have an arch design to cope with strong winds which could be encountered in exposed locations. All are fitted with some kind of shower unit. Most have fixed hand showers on long hoses, but some have removable hand showers, which can be easily replaced with brushes or shower nozzles.

Another, perhaps less common design feature, is a removable lining, which can have significant advantages. The inflated frame usually accounts for two thirds of the total cost of the unit so the lining is relatively inexpensive. As this is the part that takes all the wear and tear, especially in training sessions, it makes economic sense to be able to replace it. Furthermore, when the unit has been used in a 'real' incident the contamination is contained within the lining, which can be removed and disposed of, usually by incineration at a high temperature.

Size is another consideration when specifying this type of decontamination unit. Some designs are small, accommodating no more than two people when in use, others are larger not only accepting more people but also offering greater flexibility in the type of decontamination that can take place. Two and three-stage decontamination is possible in larger units. Ideally, an inflatable decontamination shelter should be able to accommodate stretchered casualties as well as walking casualties, and preferably large enough to handle both at the same time.

Decontamination of the emergency services is something that has been happening successfully for the past twenty years. The original wash-to-waste principle, where contaminants are discharged directly into the main drainage system, is no longer environmentally acceptable in many situations. It has been largely superseded by the containment method where wash off collected in a sump is collected and neutralised or treated for safe disposal. Consequently, the majority of the emergency services now use a wash-to-waste Decontamination Shower within an inflated shelter. This allows for the containment of the washed off contaminant, with the option of wash-to-waste in cases of major disaster, where speed is of the essence and the environmental risk is regarded as negligible.

A recent innovation has been the highly portable self-contained type of decontamination unit. Its flexibility means

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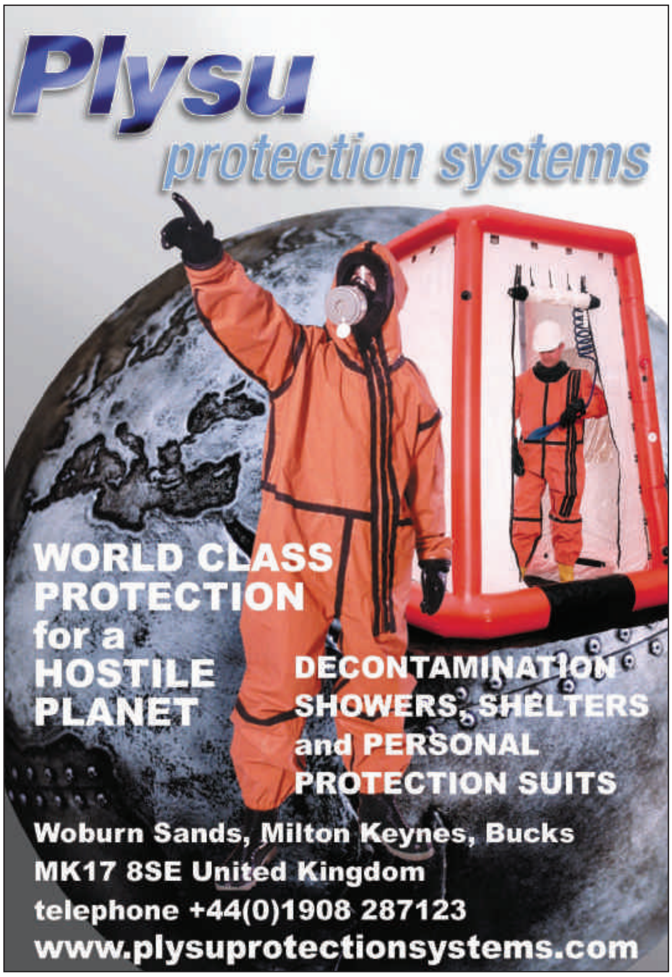

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that it is equally suitable for decontaminating the general public as well as the emergency services. The unit is stored in a small portable box or bag that contains a sump with removable lining and fibreglass grating. A simple fold-out frame is removed from the box or bag and quickly erected to form a shower cubicle, which can be fitted with different showerheads depending on the decontamination action required. The most common configuration would incorporate a shower nozzle overhead, with optional waist level spray nozzles and a hand shower or brush on a flexible hose. An additional showerhead can be fitted to the shower frame at the same time, incorporating a venturi which feeds a separate shower rose with detergent, to greatly assist the decontamination action.

A further advantage with these units is that they are designed so that only the cubicle sheeting, sump lining and grating get contaminated. These parts are all very easy to decontaminate and are cheap enough to incinerate. Several units can be placed end to end to form a mass decontamination unit with separate sections for each part of the decontamination process. Sumps can be interconnected to ensure that contaminant does not escape to the ground below. Furthermore on some models the sumps can be used on their own, without the shower or cubicle, as a temporary storage area for damaged chemical drums or contaminated equipment.

For major incidents, there are a variety of self-contained units offering a warm, protected environment for high-throughput treatment of walking and stretchered casualties. Trailer mounted versions can be towed to an incident and operational within minutes. Others, in the form of de-mountable pods, are delivered to the point of use on the back of a truck. The units usually have all the services on board – power, heat and light – and with the exception of a water supply are totally self-sufficient. Consequently, they are less dependent on the availability of local supplies and therefore suitable for a wide range of situations. Entry is usually at the rear with walking and stretchered casualties using separate doors leading to their own treatment areas. They then leave the unit through doors in the side ensuring that casualties go from the dirty area to the clean area without the risk of cross contamination. Some units are fitted with pull-out canopies to the sides providing partial protection from the elements for casualties awaiting collection by ambulance. As with an inflatable shelter, this type of unit is ideally suited to the decontamination of the public, but is not as well suited to the decontamination of suited emergency service personnel.

Hughes Portadec 1000 Portable Decontamination Shower.

As the choice of decontamination equipment continues to grow to keep pace with demand, Emergency Services must constantly assess their capability to ensure that they can respond effectively to any incident. An important part of this process involves entering into a dialogue with equipment manufacturers through direct contact and industry forums to ensure that future developments truly reflect the specific needs of both the emergency services and the public they serve.

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No Industry is Safe! *Don't Get Burned by Hot Work*

By Mark Blank
Standards Engineer, FM Global

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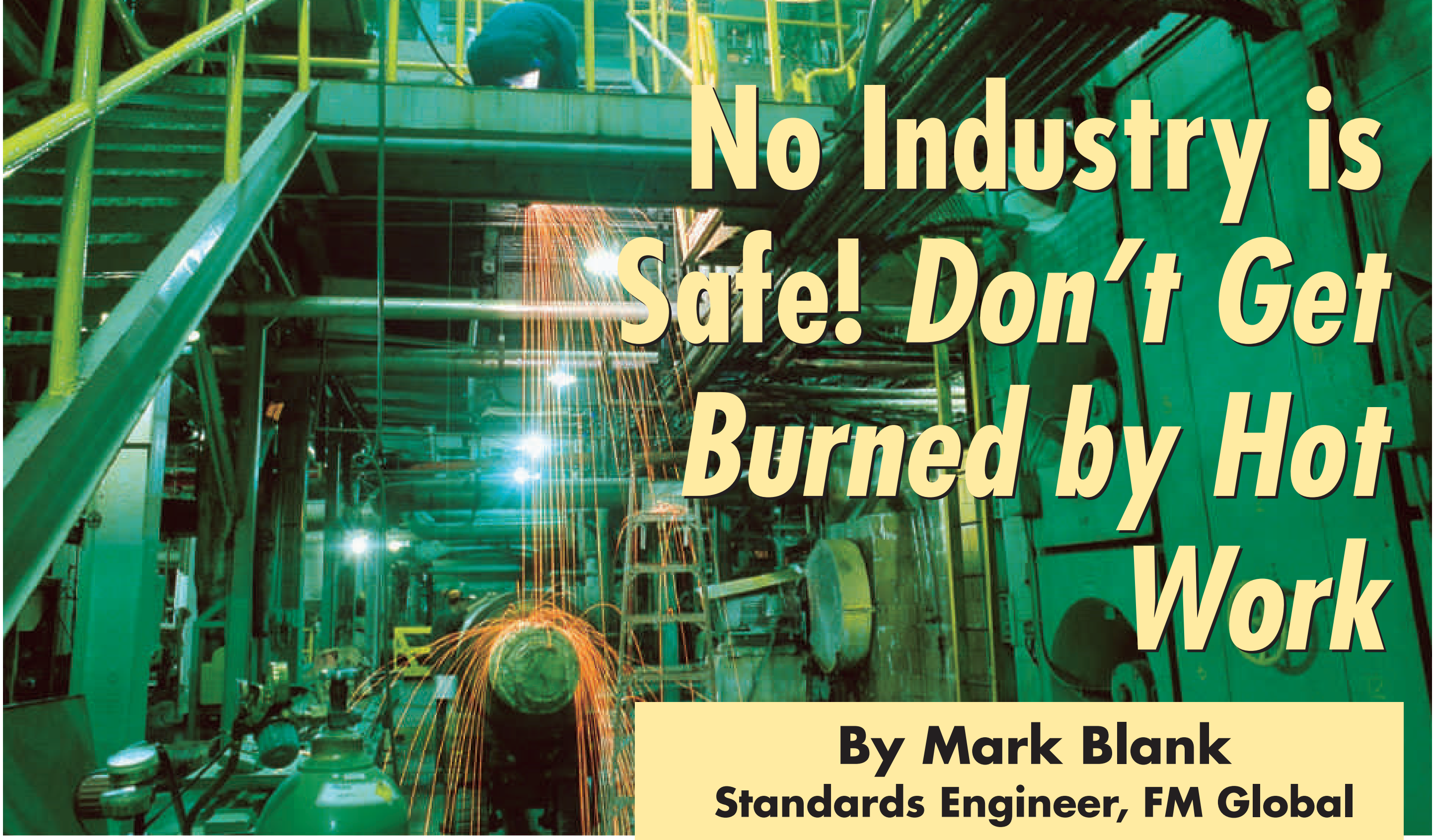

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YOUR BUSINESS HAS A STRONG CHANCE this year of experiencing a major fire from someone doing hot work or any operation producing flames, sparks or heat. The flame of a hot torch can reach up to 6000°F (3316°C). Combustible products ignite from hot work just about anywhere – in offices, storage, manufacturing, even ships.

This frequent threat can be devastating. During the past ten years, over 600 serious fires ignited by hot work damaged or destroyed a wide range of businesses insured by FM Global. Collective cost mounted to more than US$750 million in property loss and interrupted operations – an average of US$1.3 million per fire. Ironically, every loss was totally preventable.

But preventing fires caused by hot work jobs takes effort. Executive level managers must enforce a solid loss prevention program that emphasises teamwork and monitor workers closely. This article explains how to do that.

THE NATURE OF THE PROBLEM

Almost everything surrounding you can burn. As you can imagine, cutting, welding, brazing, grinding, sawing, soldering and use of open flames have the potential to become uncontrolled ignition sources. Sparks and molten globules often go flying or rolling long distances and settle in areas you can't see like tops of high ledges, floor openings, vents or recessed wall or ceiling openings. They can smoulder on or near combustible material – like insulation, wood particles or flammable liquid vapours for hours unnoticed before igniting a blaze.

Cutting into a metal wall can ignite combustible material inside the wall. Anything combustible on the other side – or close to it – can also catch fire with enough heat.

Hot work on vessels or tanks can ignite fires and explosions fuelled by flammable deposits, vapours or gases that are often invisible unless the vessels or tanks are properly inerted and checked beforehand.

Additionally, poorly maintained hot work equipment – like hoses and connections leaking gas – can ignite fires.

OVERSIGHTS = LOSSES OR NEAR MISSES

Year after year, property losses caused by hot work occur due to the same management oversights. These include incomplete loss prevention procedures disregard for managements' guidelines for protecting property, untrained personnel or unsupervised contractors taking shortcuts in the procedures and weak or out-of-date policies that inspire complacent supervision at the work sites.

Loss studies show that many companies experiencing losses neglected these four steps. Make sure your management program emphasises them:

1: SEEK AN ALTERNATIVE METHOD TO HOT WORK

Search for an equally effective way to join, trim, or sever without compromising mechanical integrity. Alternatives to hot work include:

- Cutting with hand or electric saw or pipe cutter.
- Using a mechanical way to join items together with nuts and bolts, screwed fittings or couplings.
- Using hand filing instead of grinding.
- Installing threaded pipe instead of welded or soldered where local codes permit.
- Avoiding torches (Many types of roof coverings Approved by Factory Mutual Research can be installed without torches.)

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2: PREPARE THE AREA PROPERLY

Within 35 feet (11m) of the hot work in all directions is a critical area that must be kept clear of all combustible materials.

- Make sure construction in the work area is non-combustible, including insulation.
- Shield combustible flooring with wet sand, fire retardant tarpaulins or sheet metal.
- Clean up the area, especially of oily deposits and trash.
- Remove flammable liquids, dust, lint and oily deposits; purge flammable liquids and vapours from containers.
- Cover any storage or other combustibles that cannot be moved out. Block off any duct openings. Ductwork provides an easy path for sparks to travel to other areas of the facility or to ignite deposits or linings within the ductwork.
- Cover or fill any openings in exposed walls, the floor and the ceiling with non-combustible material or Factory Mutual Research-Approved fire-stop material.
- Move combustibles away from the other sides of walls being worked on. Clean dust and deposits outside and inside enclosures and ducts.
- Provide a fire retardant covering under the hot work where hot work will occur at a height. Examples: on building framing, the ceiling or underside of the roof.
- Close all doors and fire doors. First, check to be sure there is no significant gap under the door or along its sides. Sparks can roll under a closed door and ignite combustible material outside the hot work area.

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The alternative to the 35ft (11m) rule is to designate an area only for hot work. This assumes the item being worked on can be moved into this area. Isolate the area from the rest of the facility using non-combustible screens or partitions. Never let it become a temporary storage area.

3: MAKE SURE FIRE PROTECTION AND HOT WORK EQUIPMENT WORK PROPERLY

Hot work equipment must be in good repair and automatic fire sprinklers, manual fire protection (extinguishers, fire hoses, etc.) must be available, in service and operating properly before the job starts. Note that the presence of sprinkler protection means the area either contains or is constructed of combustible material. And that one word – combustible – is a big reason for conducting hot work with great care. If automatic sprinklers are not installed in the building where hot work is occurring, alert the local fire brigade that you will be doing hot work. Appoint only trained personnel to use the portable fire protection equipment.

4: TRAIN THE FIRE WATCH

- Advise the plant emergency response team and security personnel about the hot work activity, including its location and personnel.
- Make sure the fire watch checks adjoining areas, including above and below the work area, especially where openings exist, and look out for fire during the hot work operation.
- Train the fire watch in using fire protection (extinguishers and charged hose lines) and sounding the fire alarm. They should bring portable fire extinguishers to immediate and surrounding areas, lay out fire hoses and charge them.
- Monitor the hot work area for at least four hours after the job is finished. Throughout the first hour, the fire watch continuously monitors the work site and adjacent areas. The areas must then be checked throughout the next three hours by appropriate electronic surveillance or another suitable option such as a trained alternate for the fire watch or a security guard.

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HOW DOES YOUR HOT WORK PROGRAM STACK UP?

If your company does not have a detailed hot work policy, put one in writing. Such a policy should clearly explain what your personnel should do before, during and after each hot work job. For the policy to be a success, top company management must enforce it.

Then distribute the policy to all employees (including contractors) involved with any part of the hot work process. Review and update the policy at least annually; otherwise changes in personnel or downsizing could keep the program from remaining effective.

To make sure your hot work policy is comprehensive and effective, make sure it includes:

- A statement explaining the corporate intention to control hot work.
- Methods for communicating hot work loss prevention procedures to all employees and contractors.

Procedures that include:

- A requirement to seek alternative methods to hot work, particularly during the design phase of all new construction, repair and maintenance projects.
- A process for evaluating the need for hot work.
- An assigned, named position to manage the hot work program.
- An assigned, trained, authorised hot work supervisor.
- Employee education and empowerment to stop unsafe hot work operations.
- Control and education of contractors.
- Formally stated consequences for violating procedures.

Making sure hot work supervisors are:

- Knowledgeable in fire hazards pertaining to building contents, operations and facility construction.
- Fully trained in hot work loss prevention supervision.
- Available (or on call) 24 hours a day.
- Contacted for all hot work (inside and outside of facility buildings).
- Authorised to stop all hot work.
- Required to visit all sites before approving hot work.
- Required to personally complete a hot work permit – an invaluable tool that when used properly, tracks each step of a hot work job before, during and after; and it serves as a guide as well as a warning tag and record of job completed. This tag is conspicuously posted at the job site by the hot work supervisor. Under a permit system, the firesafety supervisor authorises hot work conducted by employees or contractors only under specific fire-safe conditions. (Most facilities with good records of preventing hot work fires use permit systems. One large company issued over 27,000 hot work permits in three years without experiencing a single loss!) Organisations like the National Fire Protection Association and insurers like FM Global can provide you with more information on hot work permits.

HANDLING OUTSIDE CONTRACTORS

Loss control concerns are often overlooked when contractors are on the job, yet studies show contractors are an inherent risk, in part because they are less familiar with your facility than you are. While a contractor may have the technical expertise to do hot work, they are not likely to have a full understanding of loss prevention. Therefore, companies must monitor contractors as closely as their own employees, if not more so. In fact, an increasing number of risk managers strive to control contractors' activities from the moment they start a project until the day they leave:

The companies with the most successful hot work programs have contractors do two things before starting any job:

1 Sign a contract agreeing to faithfully follow the hot work policy and understand that the job will not proceed without one.

2 Demonstrate proficiency in the company's hot work safety training program and ability to carry out procedures.

It is also essential to:

- Make it clear to all contractors (employees too) that your policies and regulations are to be followed, or they will face potential job termination.
- Obtain references from customers of the contractors you are considering.
- Make sure bids and contracts state your policy clearly. (A few days before they begin the job, inform contractors in writing of their responsibilities for following your hot work policy.)
- Discuss the planned work with each contractor. Find out about the contractor's expertise and concern for the possible hazards, especially as they relate to the building and work environment where the hot work will be conducted.
- Confirm that contractors have proper insurance.
- Avoid signing any hold-harmless clause created by any contractor.
- Avoid waiving your company's subrogation rights.

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Empower your employees and make them accountable. Remember, the hot work hazard is often hidden even to the most experienced workers and risk managers. Every worker has a part in seeing that every precaution is followed no matter how insignificant it seems.

Cutting a corner shreds the whole effort and creates opportunity for another near miss or major loss. Property loss can amount to job loss.

The good news is – All hot work fires are preventable by knowing the hazards and following a detailed hot work policy.

For additional information on hot work loss prevention, visit www.fmglobal.com

Mark Blank is a standards engineer with commercial and industrial property insurer FM Global. He has been with the company for over 20 years. Blank holds an A.A.S. in Fire Science Technology from College of DuPage, Glen Ellyn, IL, and a B.S. degree in Fire Science Services from Southern Illinois University, Carbondale, IL. His engineering specialities include hot work application in various industries, and arson investigation.

Beware of the Quick Fix!

by Steve Tyrrell
Managing Director,
Fire Factors International Ltd

ANTICIPATION:

Providing Fire fighters with effective personal protection can no longer be left to change or favoured choice. In all parts of the world Standards enforcement is becoming a more critically assessed issue. Europe has, as might be expected, an extremely strict regime of Standards for the provision of fire-fighter personal protective equipment (PPE). North America and beyond has similar guidance promoted by the National Fire Protection Association International (NFPA). In both cases, the performance that is required of fire-fighter PPE is high and leaves room for little grace in providing anything other than an effective solution.

That said; the European and North American approaches differ in their determinations as to the effective performance levels required of items of PPE. In addition to these internationally recognised Standards, many other countries, Australia and Japan for instance, have their own national Standards, which either compliment or surmount these better known approaches. The International Standards Organisation (ISO) has for many years been working towards an internationally recognised common Standard for all items of fire-fighter protective equipment. As Readers would have noted in Issue 1 ~ March 2002 in an article by Russell Sheppard, ISO has formed a new sub committee SC14 to deal with the coordination and integration of all PPE performance requirements for environments and risks that are likely to be experienced by Fire-fighters at work. This Sub Committee is under the Secretariat and Convenor direction of Australia.

Fire-fighters are today better protected than they have ever been. This can only be a generalised statement because no matter how sophisticated we think the fire industry has become, there will always be examples of graphic contradiction. Despite the International and Regional progress that has been made with Standards there are still everyday examples of fire-fighter protection being falling short of risk control expectations.

To be effective, fire-fighter personal protective apparel must be an integrated system. That means; joined up, mutually supporting, performance matched etc. The word “integrated” is probably the phrase that is most demanding and yet is the one that is mostly overlooked. To provide a system of fire-fighter protective clothing that is constructed to a recognised performance Standard by a reputable manufacturer, there are no cheap options. The demands set for the Certification of such garments more or less disqualify the rogue trader. However, there will always be those that claim compliance without ever achieving it. Buyers beware!

EXPECTATION:

As already referred to the costs of protecting Fire-fighters is high. The reality is that the cost of not protecting them is even higher. Because of the construction requirements of producing the main assembly of fire-fighter clothing e.g.: coat & trouser, the importance of the peripherals can be easily missed.

A peripheral in the protective clothing sense are those other items that are integral to the presence of an integrated system of personal protection. The peripheral scope goes as far back as the fundamentals of incident command and control as the actual determining factor of hazard exposure. Taking this relationship as a marking point, the bare ethos means the personal protection is nothing whatsoever to do with PPE but it’s all to do with the operational tactics for personnel engagement. Being that before effective personal protection can be provided, it is necessary in the first instance to determine the degree of hazard the personnel are going to be exposed to. That means risk assessment, risk awareness and beyond that the big issue of risk management.

Taking all of this as a measure of background understanding, the focus of this paper will concentrate on what can be loosely regarded as the immediate peripherals to the PPE systems that of the protection of head, hands and feet.

SATISFACTION:

There are three main features that interest Fire-fighters as far as protective apparel is concerned:

1. Does it fit?
2. Is it comfortable?
3. Does it do the job?

Beyond that there is precious little interest and no more should there be. Except perhaps one more point of interest: “What does it look like?”

When specifying employers should only be concerned with the performance requirements that they need in their PPE to provide proper fire-fighter protection. Always the pressure of cost enters the equation, which detracts from the ideal solution. It’s an everyday fact that compromise has to be reached but this compromise should never be at the expenses of an essential performance requirement.

All too often worthy fire fighting garments are rendered ineffective by the wearing of either gloves and/or boots that do not meet a performance standard that is appropriate for the work of a fire-fighter. Industrial standards of safety are all well and good for industry, depending upon a risk assessment of course, but mostly will not be appropriate for the fire-fighter. Safety boots that are waterproof are not fire fighting boots. Gloves that withstand some heat are not necessarily gloves adequate or indeed appropriate to a Fire-fighters job. Heat protection needs to be more than stylish or traditional. In some cases the traditions that have withstood the test of time may well be the best and where this is shown to be the case the Standard will reflect that. Head protection for the fire-fighter needs to fit, stay on when engaged at work and above all be comfortable. Mostly any comment or observation that can be made about one item or another can relate equally to the others.

Related values + Related performance = Integrated system.

FIT FOR PURPOSE:

There are many excellent products for Fire-fighters to choose from. They will all do a job to one degree or another and they all have their own design characteristics and performance levels. Some may be copies of others and so on but that doesn’t necessarily make them bad or deficient. They may be in different colours and shapes with a whole host of performance claims which may or may not have any substance or validity. The maze for the employer is to manoeuvre through this bog of complications and end up with the right product with the right performance that has a proven record and represents best value. Not difficult – all you need to be is an expert in five or six different industries as well as being able to disseminate and distinguish between the moral and legal issues of Standards!

Some manufacturers/suppliers assume a responsibility for the presentation and assurance of performance based compliant integrated solutions to the fire-fighter. That simply means quality and reliability!

As something of a case study, Lion Apparel – Asia Pacific is part of the Lion Apparel group and are on a global scale the largest producers and suppliers of fire-fighter PPE. It's important for any company but particularly one that has a worldwide reputation to support, to be associated with both quality and reliability. The product Lion produce themselves is a contained quality performance issue and really straightforward to control. The risk exposure for any provider, particularly one of global dimension, is the product brought in to the integrated approach that Lion offers to their customers. Simply put, a company such as Lion Apparel cannot afford to be associated with anything other than the absolute best. Anything less would not only present a greater commercial risk but more damaging still a reputation risk.

Appreciating this kind of commercial scrutiny, organisations can benefit from having to undertake their own torturous process of deliberation, evaluation and decision. What should be the way is for the organisation concerned to determine performance needs and specify accordingly. There is no need to become absorbed in the endless dilemma of product decision or moreover, indecisions. Lion's solution is based upon:

Highest product quality + Highest product performance = Lowest risk

Fire-fighter boots for example; these are supplied by the Haix® company located in Mainburg, Germany, which is some 25km from Munich. They are a specialist footwear manufacturer that only produce product for special need users such as; Fire-fighters, police, special military and high demand specialised industrial applications. Haix is not a fashion producer, they are recognised worldwide as being at the very top of the first division for high quality footwear. They only make special boots for special people who have special needs. As can be seen from the examples shown, there are a number of different styles, all certified for fire fighting use. The operational demand for each style is different depending how they integrate with the design of the lower body clothing protection as well as the risk assessed task expectations of the fire-fighter. It isn't easy to do the job properly!

In a similar way, the Seiz® glove has been brought into the Lion Apparel programme. Again, the assurance is based on quality product from a world-class manufacturer. Seiz is also a German based company who produce in excess of 20 million pairs of gloves each year. They have product throughout the expected range of industrial uses as well as special product for fire, police and military applications.

Any quality manufacturer will be able to offer a range of performance and style options if asked to do so. Some will be a one trick pony of course but any conclusion about their lack of options shouldn't necessarily detract from the quality assessment made of the product. Make sure any product that is selected has valid test certification!

Haix Boots – Courtesy of Lion Apparel.

Haix Boots – Courtesy of Lion Apparel.

Head protection system F1

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Seiz Gloves – Courtesy of Lion Apparel.

RESPONSIBILITY:

Regardless of who the actual supplier or manufacture is, the objective of the case example that has been reviewed; is the emphasis that should be placed upon premium solutions in securing assured levels of fire-fighter personal protection. An integrated outcome can only come about if there is an equally integrated process of determination in place. All too often levels of protection are thought about and evaluated in isolation to one another. This is not only unwise but can also detract from the principle objective of protecting the fire-fighter at work.

Where reputations are at stake and a contract can be won or lost on the back of the feedback about a company's existing market performances, there really is very little scope for a second chance if Fire-fighters have been let down with the quality and performance of the product supplied to them. In the aftermath of failure there is no place for either excuse or the wisdom of hindsight; in risk management terms you have just gone off the scale!

Personal protection will always be a critical issue no matter what particular workplace or, the environment in which it is placed. The protection of Fire-fighters in their risk dynamic workplace environments is even more critical. It's the risk business and exposure to hazard is the hazard Fire-fighters face every time they go to work. It simply isn't good enough anymore to just provide some form of perceived protective clothing; a set of overalls, a pair of rubber boots, some work-wear gloves and a hard hat that probably doesn't even fit more or less actually offer any real protection to the wearer.

Seiz Gloves – Courtesy of Lion Apparel.

The assessment of a Fire-fighters function is a matter of international record. The International Standards Organisation (ISO) has and still is devising Standards to ensure that Fire-fighters have PPE that is both appropriate and properly protected in their chosen workplace environments. There can no longer be shortcuts or half way solutions just to save some money. Firefighters not only deserve the best, the society they protect demand it!

RESOLUTION:

A system of integrated personal protective apparel that is, without question, assured as being "Fit for Purpose".

Steve Tyrrell has over 35 years experience in the Fire Engineering sector that has seen him reach Principal Level Command in the London Fire Brigade. His professional involvements include being a Member of the Institute of Risk Management, a Member of the International Institute of Risk & Safety Management and a Fellow of the Institution of Fire Engineers. Steve also Represents the UK on European (CEN) and International Standards Organisation (ISO) Committees in respect of Fire-fighter Protective Apparel. He is currently the Managing Director of Fire Factors International Ltd, a Consulting Company that specialises in all aspects of the protective clothing industry.

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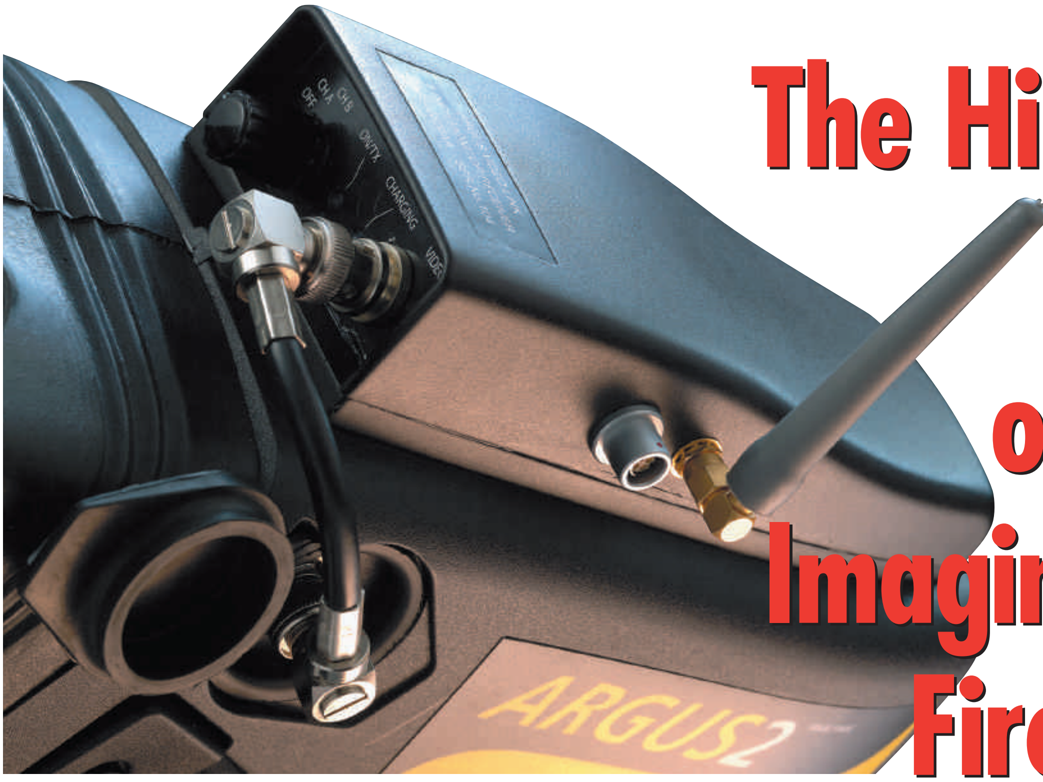
The History and Evolution of Thermal Imaging used in Fire-Fighting



Argus2 thermal imager with wireless video link unit.

by Colin Buggeln, Veronique Probyn and Phil Colley

Twenty years ago a new technology was made available to firefighters. Thermal Imaging had previously been the preserve of high-end military programs – expensive, heavy and inflexible – it clearly had a future, but could it be harnessed to have an impact on everyday life. Two decades on, the advantages are now well documented with the count of people and property saved around the world steadily rising but, how did this technology develop and where is it likely to lead? Read on.

In the late 1970s a UK government's Central Fire Brigade Advisory Council reported on assisting the vision of firemen in smoke. The report examined technologies that could help with the age-old problem of locating casualties and the seats of fires in thick smoke. The report correctly identified that long wavelength infrared radiation was almost unaffected by all classes of smoke. It was found that a suitable thermal imager would be able to "see through" smoke – almost as if it wasn't there.

An ideal solution on the surface. In reality however, thermal imaging had been around for a considerable amount of time – but most of the systems used had been designed for the military. This meant that they were designed to be fixed to vehicles, aircrafts and ships and utilised detectors that had to be cooled down to very low temperatures in order for them to work properly – that, and they were horrendously expensive!

Luckily, a solution was in hand! The vacuum tube called "pyro-electric vidicon" (Pevicon, trade marked by Marconi Applied Technologies, then EEV) was originally designed for military applications. However, the technology had never reached the performance needed for a military system, but was both relatively cheap to produce and most importantly did not require cooling to operate.

At the time of the report, a handful of Pevicons™ were being produced per year and being sold to academic and research bodies – an interesting technology in search of real market applications.

In the early 1980s, Applied Technologies developed a camera system based on the Pevicon™, which they successfully trailed in conjunction with a small number of UK fire brigades. However, the camera was still seen as something of a novelty, rather than the essential fire-fighting tool it was set to become.

SO WHAT CHANGED?

The UK became involved in the Falklands conflict.

Images of Royal Navy ships with thick smoke billowing from them were seen around the globe. This smoke impeded the efforts of fire and rescue teams on board – and there is perhaps nothing so frightening as the prospect of a shipboard fire (unless perhaps an aircraft fire). Civilians and fire crews alike know there is little opportunity of escape, or the likelihood that the fire will burn itself out. Multiple sealed compartments can fill with smoke, hampering navigation through the ship and making the location of the seat of the fire a slow and time consuming process – time that isn't available.

It was this urgent operational requirement that lead the Royal Navy to deploy the first cameras into shipboard use and they rapidly became an invaluable tool, helping to reduce losses due to fire both in peacetime and battle situations. Many of the other European and Commonwealth Navies rapidly followed suit and late in the 1980's – after serious damage was sustained by the USS *Stark* in a Gulf incident – the US navy and coastguard made the Pevicon™ based camera standard damage control equipment throughout the whole fleet. At last thermal imaging had started to become standard equipment in fire and rescue stations – at least for military applications.

Although the Pevicon™ program had originally been started to address needs in the civilian fire-fighting market, it was not until the early 1990's and the

The P4228 fire-fighters thermal imaging camera by EEV (now Marconi Applied Technologies) and a Pevicon sensor.

saturation of the military shipboard market that major manufacturers once again turned their attention to this market. It became evident that while the military could easily justify the expense of a thermal imaging camera – setting this off against losses caused by fire – finding the funds to buy would prove more difficult for most of the world's civilian brigades.

WHERE TO?

The solution was a cheaper camera. Applied Technologies launched their Argus camera specifically designed for civilian usage at 70% of the price of the cameras supplied to the military market. The camera was of equal performance to the military units and still based on the Pevicon technology. It was, however, from the outset designed for volume manufacture and fast assembly, enabling substantial cost savings to be passed on to end-users.

TECHNOLOGY DEVELOPMENT

The next major milestone in the evolution of fire-fighting cameras happened in the mid 1990s with the commercial availability of a new range of solid-state detectors manufactured by Raytheon Corp. in the United States. These detectors were the result of many years and billions of dollars worth of investment, principally by the US government, aimed at producing lower cost and more flexible thermal imaging systems for military use. Although driven by military needs, most of these program were funded on the "dual use" principle, meaning that usage for the detectors was envisaged both for military and civilian fire-fighting applications.

These new detectors are still in use today, and are called Focal Plane Arrays (FPAs). They take the form of a flat device placed behind the camera lens at the focal point. Unlike previous vacuum technology, these sensors have a discrete number of picture elements (pixels) – with the most common arrangement being 320x240. This format gives a total of 76,800 pixels, enabling the device to output a far clearer picture than was previously possible. It is noteworthy however that this is a long way away from the latest optical devices used in normal cameras, where 1,000,000 and 2,000,000 pixel sensors are common.

The availability of the new detector breed opened the market to competition, and today cameras for fire-fighting purposes are manufactured and offered by at least 10 different companies, principally from the UK and US.

The Argus1 thermal imaging camera.

Increased competition and volumes have also meant that the price of cameras has fallen dramatically in real terms over the last 10 years. This has resulted in the ever-increasing use of the technology worldwide. In addition, better images are commonplace and improvements in electronics allow manufacturers to offer many additional features, enabling the camera to be a more flexible and useful tool. Today, remote video transmission, temperature measurement and digital zoom are common offerings.

BUT WHAT OF THE FUTURE?

As with consumer electronics, the pace of development in fire-fighting thermal imaging cameras seems to get faster and faster. The current annual sales of fire-fighting cameras total around 5000-8000 units – the sort of units that a manufacturer of consumer electronics might expect in one day – but despite this modest figure, the worldwide application of thermal imaging across multiple uses is expanding rapidly. The latest development is the use of cameras in the automotive market (Cadillac are offering a system produced by the US company Raytheon Corp). The overall market expansion is funding even more exciting detector developments, and will help to force down the cost of the devices over the next few years, as volumes increase.

By the end of this decade there is a very real possibility of fire fighting cameras being readily available for just a few thousand dollars. These new cameras could be small and light enough to be integrated into the fire fighters breathing apparatus. With this fully integrated system available to all fire-fighters wearing breathing apparatus, thermal imaging will have fully realised its potential – enabling smoke to become as normal as daylight vision.

> Whilst fire-fighting will always remain a difficult and dangerous job it is clear that thermal imaging is probably the most significant development in fire-fighter safety since the introduction of breathing apparatus.

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Faster Water Transit Times for Large Dry Pipe Fire Sprinkler Systems

Predicting water transit times for fire sprinkler systems controlled by conventional differential dry pipe valves has long been the nemesis of the design technician. Section 4-2.3.1 of the 1999 edition of NFPA #13 states that not more than 750 gallons (2,839 L) of system capacity shall be controlled by one dry pipe valve. The "exception" to this limitation allows the system piping volume to exceed 750 gallons (2,839 L) provided that the system design is such that water is discharged from the inspector's test connection in not more than 60 seconds. This exception gives contractors the opportunity to test the limits of their design creativity and nerve.

How big is "too" big for the dry pipe sprinkler system? This is the real question. Traditionally the contractor has had to build the dry system and open the inspector's test valve in order to get a measure of the system performance. Should the dry system fail to meet the 60 second criteria, the traditional response has been to lower the system operating air pressure to a minimum in order to improve the water transit time.

Taking this time proven approach, The Reliable Automatic Sprinkler Company has developed a new dry pipe system that lowers system air pressures. This new system is called the LDX system. LDX stands for Lo-Pressure Dry system with an external reset. Lower system operating air pressures provide the contractor with the opportunity to install larger dry pipe systems with faster water transit times.

Traditional differential dry pipe valves have a 5 to 1 air to water area ratio of the clapper assembly. Reliable's LDX system has a 17 to 1 ratio. The high ratio of the LDX valve allows high static water pressures to be held back with very low air pressures.

Even with the high ratio LDX system and lower system air pressures, the question remains, how big can the system be? How does one calculate the water transit time? Hydraulic calculations for fire sprinkler systems are relatively simple due to the fact that the water traveling through the sprinkler system piping is in a steady state condition. Although the process can be arduous to tabulate all of the flows and friction losses in the piping network, the governing equations are relatively simple compared with the mechanics of water entering a dry pipe sprinkler system that is charged with air. When both air and water are simultaneously flowing through the same piping network, the system is experiencing a two-phase flow of fluid. The air is the gas phase fluid and the water is the liquid phase fluid. Each phase of fluid flow is subject to it's own set of governing equations and to complicate the mechanics further, the air is being compressed and hence is not in a steady state flow condition. Simply stated, the analytical calculation for the water transit time in a dry pipe sprinkler system is far too complex to be solved economically. As discouraging as this sounds at this point, there does exist a simpler approach to this complex task.

As industry professionals we are all familiar with the Hazen-Williams formula for calculating the pressure loss of water, traveling under steady state conditions, through standard piping geometry. But perhaps we are not as familiar with the history or the mechanics behind the Hazen-Williams equation. Messrs. Hazen and Williams did not take an analytical approach to their equation, but rather an empirical approach. Hazen and Williams actually built piping networks connected to a water storage vessel and measured the actual pressure drop across the piping for an array of various pipe sizes and flow rates. Thus armed with volumes of data, they returned to the laboratory and plotted the results. Their equation is a fit to the graphed curves of the measured data and not analytically derived.

Reliable has taken an analogous approach to the water transit time issue in large dry pipe systems. We have been systematically measuring our LDX performance in an effort to tabulate a base of data for which large dry systems meet the 60-second requirement. From this approach we have identified some of the limiting factors in dry system performance.

First, the water supply must be adequate to operate the system. The true measure of the kinetic energy of a water supply is the flow rate, in gallons per minute (gpm). The flow rate directly translates to the velocity at which the water will travel through the piping. As a general guideline or rule of thumb, the minimum required flow rate is twice the systems capacity. The second limiting factor is the overall travel distance from the LDX clapper to the inspector's test discharge orifice. The test data reveals that 450-ft. of travel distance approaches the upper limit of success.

Travel distance and water supply flow rate are the two most important factors to consider when designing large dry pipe sprinkler systems. The following is a list of design suggestions that will improve a systems ability to meet the 60-second rule:

- Do not loop the cross mains. Center or end fed systems work best. Looping the cross mains is a very hydraulically efficient, but can double the water transit time since the supply needs to fill both legs of the loop simultaneously.
- Locate the LDX system riser as close to the hazard as possible. Avoid long runs of feed mains.
- Use large orifice sprinklers (K= 8.0 or greater). A large orifice smooth bore bushing in the inspector's test will discharge the air in the system exponentially faster than standard $\frac{1}{2}$″ sprinklers.
- Keep the length of the inspector's test piping to a minimum.
- Make the pipe size of the inspector's test line the same size as the branch line tailpiece that supplies the last sprinkler.
- Use a quick opening, full port ball valve as the inspector's test valve.

For more information, please contact:

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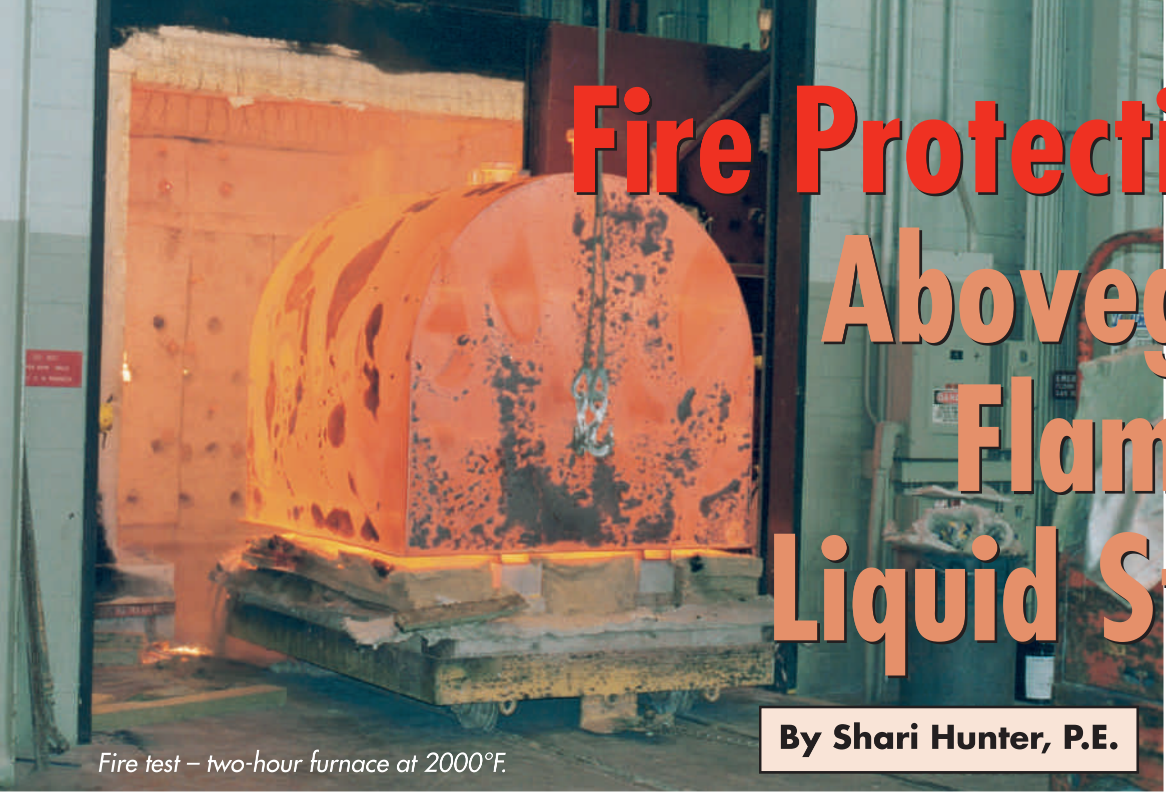
Fire test – two-hour furnace at 2000°F.

Fire Protection for Aboveground Flammable Liquid Storage Tanks

By Shari Hunter, P.E.

There a several ways to provide protection from fire for aboveground flammable liquid storage tanks. Protection methods allow aboveground tanks to be installed with reduced setback distances to buildings or property lines. One method to reduce the setback distance is to install a fire suppression system in or around the tank. Another method is to enclose the tank in a 6 in. (15.2 cm) reinforced concrete vault, known as a special enclosure. Another method is to include the insulation system within the tank design. UL developed two safety standards for tanks that include an integral insulation system intended to reduce the heat transferred to the primary tank when the tank assembly is exposed to a fire. The Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids, UL 2085, covers Protected Tanks and the Standard for Fire Resistant Tanks for Flammable and Combustible Liquids, UL 2080, covers Fire Resistant Tanks.

Calibrated device for ballistic test (measures velocity of bullet).

There are two typical designs for Protected or Fire Resistant tanks that are utilized by the majority of tank manufacturers. One tank design consists of a primary tank constructed in accordance with the Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids, UL 142, with a secondary containment outer shell that creates an interstitial space capable of being monitored for leakage and also encloses the primary tank. The porous insulation, consisting of a proprietary blend of foaming agents and fire resistant materials, is poured into the interstitial space. For this tank design the insulating material is between the primary and secondary tank.

Another typical tank design includes a steel primary tank surrounded by a tightly wrapped secondary containment shell. The assembly is placed into a mold and the fire resistant insulating material is poured around the outside of the secondary containment shell. For this tank design, the insulating material is outside of the secondary containment shell.

Both tank designs have demonstrated compliance with the requirements of a rigorous fire test. A sample tank is placed in a furnace and the temperature is quickly elevated to 2000°F (1093°C) within 5 minutes and held at 2000°F (1093°C) for a period of two hours. Prior to the fire test, the tank is equipped with thermocouples placed inside the primary tank at various locations. The steel temperature of the primary tank is recorded throughout the two-hour fire exposure.

In addition to the two-hour fire test, tanks with insulation in the interstitial space undergo an open field fire test. During this test the space between the primary and secondary tanks is filled with gasoline and the tank is placed in a steel pan filled with diesel fuel and ignited. The pressure in the interstitial space is monitored to determine acceptability.

The UL Standards for Fire Resistant and Protected Tanks were developed based on changes in installation codes – the National Fire Protection Association (NFPA) and the Uniform Fire Code (UFC). Based on the NFPA fire code to allow a reduced setback for aboveground tanks, UL developed requirements in accordance with the performance criteria specified in NFPA30A, Motor Fuel Dispensing Facilities and Repair Garages. The requirements, covering Fire Resistant Tanks, were published in 1992 and were subsequently subject to review by the NFPA technical committee for NFPA30A. During the timeframe that UL was working with NFPA, similar requirements for "Protected Tanks" were being developed by a technical committee of the Uniform Fire Code, (UFC). The UFC and NFPA are two separate fire code organizations within the USA. Some states adopted the UFC and other states adopted the NFPA fire codes.

There are primary differences between the Standards for Fire Resistant Tanks and Protected Tanks standards. The most significant difference between these two standards is the maximum allowable temperature on the primary tank during the fire test. The criteria is summarized as follows:

	UL2080 Fire Resistant Tank (NFPA) Requirements	UL2085 Protected Tank (UFC) Requirements
Maximum average temperature	800°F (430°C) max average rise	260°F (144°C) max average rise
Maximum single point temperature	1000°F (540°C) max	400°F (204°C) max

The technical rationale for the maximum temperature limitations on the primary steel tanks is based on two fundamentally different viewpoints: mechanical strength of the material versus auto-ignition temperature of the tank contents.

The NFPA30A Technical Committee indicated that the temperature limitation should be based on the mechanical properties of steel and 1000°F (540°C) was chosen as the maximum single point temperature in conjunction with the point at which steel begins to loose some of its mechanical strength.

The Uniform Fire Code adopted requirements for Protected tanks that were focused on limiting the maximum temperature of the primary tank contents below the auto-ignition point of the typical flammable liquids. Therefore, the Standard, UL 2085, indicates that no single temperature at a thermocouple on the primary tank is allowed to exceed 400°F (204°C), which is the auto-ignition temperature of n-heptane, a typical constituent of gasoline.

Protected Tanks, unlike Fire Resistant Tanks, are required to undergo a hose stream test immediately following the full scale, two-hour fire endurance test. Both types of tanks have the option of being subjected to a "Vehicle Impact" test and a "Ballistics Impact" test.

The hose stream test is intended to simulate the cooling and impact forces that can occur following a fire. Immediately following the fire exposure test, the Protected tank is removed from the fire test chamber and subject to the hose stream test. The tank must withstand the force and continue to be leak tight.

The ballistic or projectile impact test is intended to simulate a sharp impact. The test is conducted on a sample tank by firing a several bullets from a rifle into the most susceptible tank surfaces. The caliber and muzzle velocity of the bullets is specified. Following this test, the tank is to remain leak tight. This test is optional and tanks complying with this requirement provide additional protection from sharp impact.

The vehicle impact test simulates that a tank can withstand the same collision force for which protective bollards are designed. Bollards are steel cylinders filled with concrete, which are located at service stations protecting the gasoline dispensers. The vehicle impact test utilizes a striking face similar to that of an automobile bumper. The force at impact is equivalent to 10,000 lbs at 10 miles per hour. The tank must remain leak tight following this test. This test is optional and tanks complying with this requirement provide additional protection from blunt impact.

The UL Listing Mark on Protected Tanks and Fire Resistant Tanks states "This tank has not been investigated to determine acceptability for use after fire exposure". The decision to continue use of a tank after fire exposure is determined by the tank owner and the regulatory authority.

UL Listed tanks that have passed the fire test, projectile test or vehicle impact test provide an additional level of protection for the primary steel tank. These tests are not intended to indicate that a tank is suitable for use after a pool fire or significant impact or other multiple hazards. Testing cannot be expected to represent all potential exposures in the field. It is always the responsibility of the tank owner and the regulatory authority to determine whether the tank, either repaired or not, can be used safely after an exposure fire or impact condition. A number of scenarios could develop which would cause an irreversible reduction in the tank's mechanical integrity or ability to continue to perform properly.

In addition to the overall degradation of the structural steel supports, devices and accessories may distort. On sample tanks for the fire test, accessories typically melt or fall off. Openings provided for leak detection equipment, shut-off valves, and emergency vents may be damaged to the extent that they could not be used effectively after a fire exposure. Insulating materials also become brittle after the fire test and they may crack easily.

UL also evaluates factory fabricated, pre-engineered tank assemblies in accordance with the Standard for Aboveground Flammable Liquid Tank Systems, UL 2244. Tank systems consist of a UL Listed tank, such as a UL2085 Protected Tank, core components and optional accessories. The core components are mandatory items required by the fire codes such as emergency vents, overfill prevention, liquid level gauges, secondary containment, etc. Optional accessories include access ladders, lighting and photovoltaic power supplies.

Specifiers benefit by requiring a UL Listed tank system since it can consolidate a number of bid specification components and streamline the bidding process. Inspection officials also benefit since the documentation provided with the tank system identifies item-by-item compliance with the fire codes. For example, a tank system will have documentation verifying that the emergency vents have been sized in accordance with the exposed wetted surface and that no vent reduction factors were allowed.

Underwriters Laboratories, an independent, not-for-profit testing organization founded in 1894, tested more than 18,000 types of products contributing to over 17 billion UL Marks appearing on products in 2001, including many products used in the petroleum equipment industry, fire resistive constructions and fire protection equipment. UL standards can be ordered from comm 2000 found at http://www.comm-2000.com/ or by calling +1-888-853-3503.

"Tank system" with protective bollards and access ladder.

Shari Hunter is a Manager of Conformity Assessment Services at UL's Santa Clara California office. For questions, comments or product submittal information, contact UL at http://www.ul.com/.

ALARMCOM PRESS RELEASE FC500C PANELS

Safe & Easy Conventional Fire Panels.

Alarmcom is pleased to launch its new conventional panel series the FC500C. The range consists of 2, 4, 8 and 12 zone versions all coming with a wealth of features to ensure compliance with the toughest of specifications.

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The FC500C is fully compliant with EN54 parts 2 and 4 and can provide capacity for up to 72hrs of integral standby.

The system has the ability to operate in manned and unmanned mode which allows signalling to the fire brigade to be delayed in the event of operation of an automatic detector while signalling immediately if a manual call point or further detection zone is activated. Manual call points can be mixed on a zone with automatic detectors and still provide manned/unmanned differentiation.

Outputs are provided for fire, stage 1 and 2 alarm, fault and disable as well as individual outputs for each zone. Additional inputs are available for remote evacuation, acknowledge, reset, access, manned/unmanned switching and remote transmission disable. Numerous programmable features complete the ranges ability to match most requirements.

For more information, please contact:
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NEW SYNDURA FLUORINE FREE FOAM FOR AVIATION SECTOR

Syndura from Angus Fire is the world's first operational Fluorine Free Foam (F3).

Fluorine compounds have been used in high performance fire fighting foams like AFFF for many years. However, concerns have been expressed recently about their potentially harmful long-term effects on the environment.

In response to these concerns, Angus Fire has become the first manufacturer to successfully eliminate fluorine compounds from foam without compromising fire fighting performance.

Syndura is approved to International Civil Aviation Organization Level A performance; it is listed by Underwriters Laboratories for use with portable and fixed foam-making equipment; and it also meets the requirements of the new EN 1568-3:2000 European foam standard.

Syndura has also demonstrated outstanding fire fighting performance in a series of simulated aircraft crash fires carried out by the UK MOD Fire Service. On a fully involved 280m^2 fire involving 2,500 litres of aviation fuel it achieved complete extinguishment in only 50 seconds.

Furthermore, Syndura is ideal for fire professionals who are currently prohibited by environmental regulations from using fluorine-based foam in non-emergency applications. Typical examples are civilian and military airport fire services that are unable to carry out vehicle testing and training exercises.

Syndura is the latest "first" from the Angus Fire Technology Centre. It was developed in cooperation with research scientists at Angus Fire's parent company Kidde plc, the largest independent group of fire equipment manufacturing companies in the world.

Angus Fire's Mike Willson comments "Angus Fire is committed to meeting the needs of fire fighters while at the same time complying fully with environmental regulations. It's in everyone's interest that effective fluorine free foam technology has now become a reality".

For further Information please contact:
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Another main objective is to constantly grow and evolve and with this in mind, we strive to create new technologically advanced products to offer our clients. This allows us to supply custom made items to satisfy special requests and needs. Thanks to our research department, so far this year, we have already been able to include eight new products in our catalogue.

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New emergency signals combine good looks, installation flexibility and unbeatable performance.

Edwards Systems Technology (EST) is pleased to announce the addition of speakers and speaker-strobes to their award-winning Genesis family of emergency signals. Extending a mere 25mm from the wall, these signals are the most compact UL and CE listed speaker-strobes available today.

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Genesis speaker-strobes can also save lives. Thanks to EST's exclusive FullLight™ strobe technology, these signals produce the industry's most even light distribution, ensuring they will be noticed from virtually any viewing angle.

Ultra-slim good looks, cost-saving features, and unbeatable performance, EST's new Genesis speakers and strobes are sure to become a fixture of any carefully designed life safety system.

Edwards Systems Technology, a unit of SPX Corporation, is a world leader in the design and manufacture of fire detection, security, emergency evacuation systems and life safety products for commercial, industrial and institutional applications. The company's intelligent life safety systems protect lives and livelihoods throughout the world. SPX Corporation is a $5-billion global provider of technical products and systems, industrial products and services, flow technology and service solutions. SPX, headquartered in Charlotte, North Carolina, has operations in 34 countries.

For more information, please contact:
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Tel: + 1 905 270-1711
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NEW HOLMATRO® NCT™ (NEW CAR TECHNOLOGY) HYDRAULIC CUTTER SERIES

Holmatro® recently introduced a hydraulic cutter series with a new blade type specially designed for new hard materials and constructions used in modern vehicles. These so-called NCT™ cutters cut sills, A-, B- and C-posts of modern vehicles much more efficiently (i.e. at a much lower pressure/force) and smoother than conventional cutters so far.

Under influence of the European norm many cutters marketed today come with a similar blade type, resulting in versatile cutters, for a wide variety of applications. However, from regular cutting tests on the latest vehicles and prototypes, Holmatro® found out that a totally different blade type is more suitable for the materials and constructions of modern vehicles. Holmatro® introduces this new blade type, with a revolutionary 90° blade angel on its new NCT™ cutter series. Apart from the blades, these cutters are identical to the conventional Holmatro® cutters.

The Holmatro® CU 3035 NCT™ and CU 3040 NCT™ cutters need less pressure to cut modern vehicle materials and constructions than conventional cutters. **NCT™ cutters have up to 60% more excess capacity for future vehicle developments than conventional cutters!** And: vehicles will continue to get stronger. Because of the controlled and smooth manner of cutting, little rest energy is released.

Holmatro® now offers rescuers a choice. Rescuers should choose a Holmatro® general-purpose GP cutter (conventional cutter) if their application varies from vehicle accidents to collapsed buildings, train accidents, etc. Rescuers should definitely choose a Holmatro® NCT™ cutter if their main application is vehicle accidents.

For more information, please contact:
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Website: www.holmatro.com

UK DECON TECHNOLOGY PLAYS WORLD ROLE IN WAR ON TERRORISM

In the worldwide surge of interest in portable inflatable decontamination technology products, stimulated by the US declaration of war on terrorism, particular interest has been shown by those produced by a UK company, Plysu Protection Systems.

Recently awarded the UK government contract for the production of the UK emergency services first standard portable inflatable decontamination shower for casualties the company's products are now in use worldwide, and can be found anywhere from the headquarters of the US Army's Strategic Operation Command at Fort Bragg to a waste recycling plant in the Czech Republic. In SE Asia Plysu's systems are used by the Japanese Defence Agency, various Japanese City Fire Departments, the Hong Kong Fire Service and Taiwan's Emergency Services.

A number of basic units are offered by Plysu, suitable for both the decontamination of protective clothing as well as casualties, but everything that the company makes is customised according to customer specification. When not in use the units are stored in a holdall. In the case of the smallest unit this weights 35 kg, which on inflation becomes, in moments, a 1900mm wide by 1900mm long 2300mm high shower cubicle with all its shower equipment ready to go to work.

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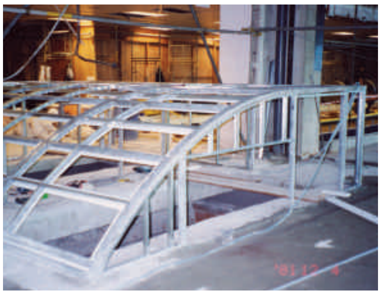

Fire Rated Baggage Check-In at World's Best Airport.

Singapore's Changi International Airport Passenger Terminals handle some 5-6 million travellers annually.

The new baggage check-in structure at Terminal 2 was constructed by employing the versatile and flexible PROMATECH-H Calcium Silicate Boards, carried out by the local Promat representative.

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Protector and Sabre are internationally renowned as premium personnel protective equipment brands. The range includes breathing apparatus, respiratory and head protection, gas detection and medical oxygen products. All have earned a deserved reputation for quality, reliability, comfort and ease of use over the last 30 years.

In September 2001 Tyco acquired Protector Technologies and the Sabre and Protector range of products became part of the Tyco Fire and Security Division.

Scott Health and Safety, the worlds leading breathing apparatus manufacturer, Scott Oy, a leading respiratory protection equipment company and Scott Instruments, designers and manufacturers of Gas Detection equipment, were already part of the Tyco Fire and Security portfolio.

"When we announced our acquisition of Protector Technologies we pointed to the huge opportunities for technology transfer and team based global development that we now had within the group." said Nigel Trodd, Vice President, Europe, Middle East and Africa, Tyco Suppression Systems. "The key objective is to deliver customer focussed solutions to personnel protection problems and whilst we have only been together for 8 months we have already put in place global project teams working on delivering these benefits to our customers. A rolling programme of new initiatives will be launched this summer."

"In recognition of our increased global focus and portfolio we are renaming our Protector Technologies operation Scott International. This will remain a separate company within Tyco Fire and Security, based at Skelmersdale, England, and will work very closely with all the other Scott companies in the USA and Europe."

"In changing the company name we want to clearly communicate the fact that we are one team; a team dedicated to providing personnel protection solutions that our customers will use by choice rather than necessity."

A new web site supports the new Scott International portfolio. This can be viewed at www.scottint.com

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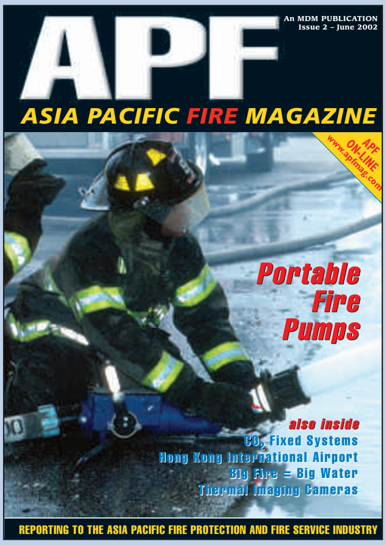
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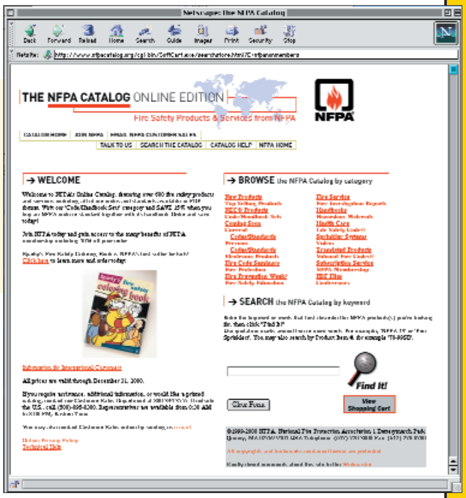
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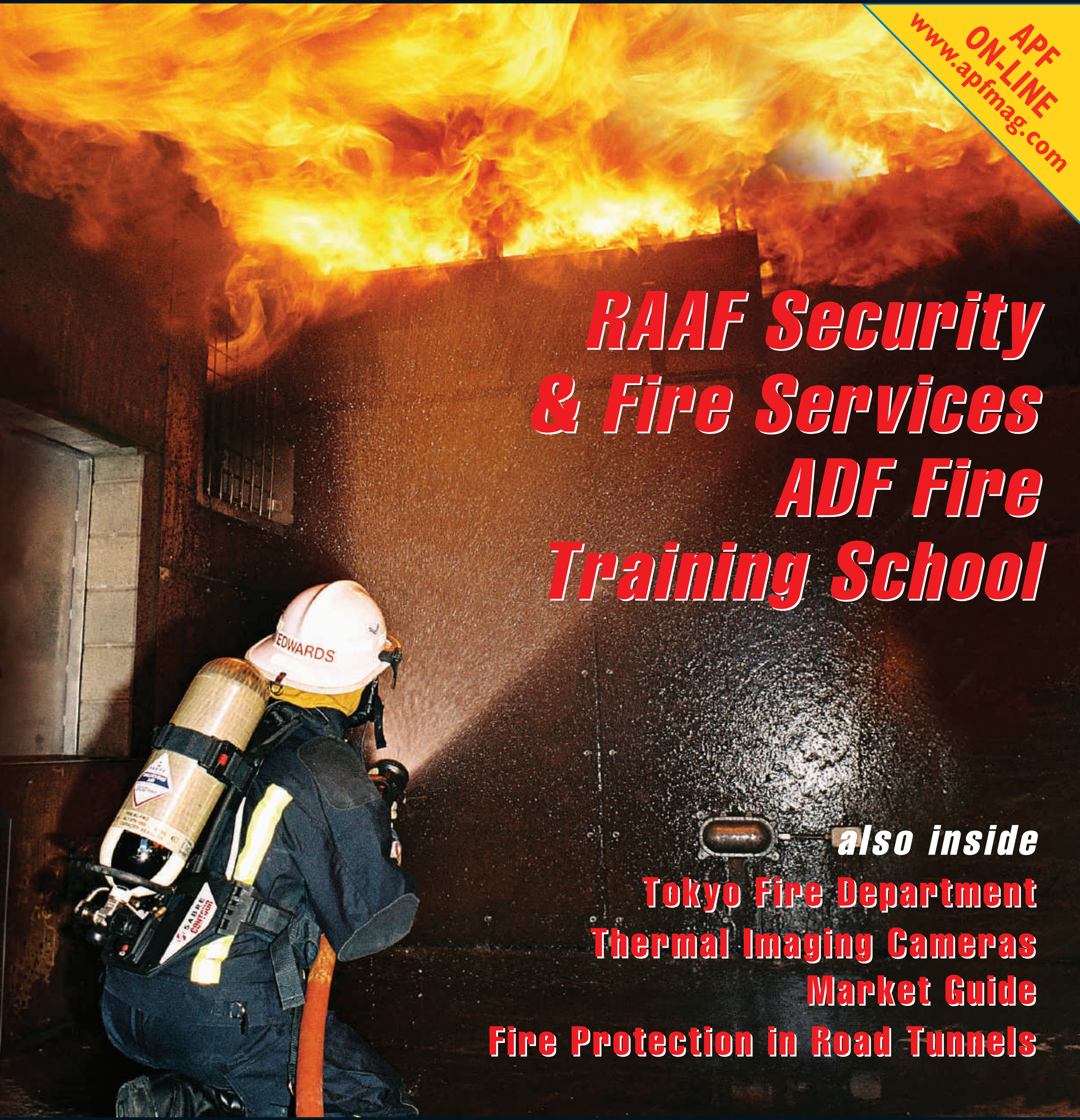

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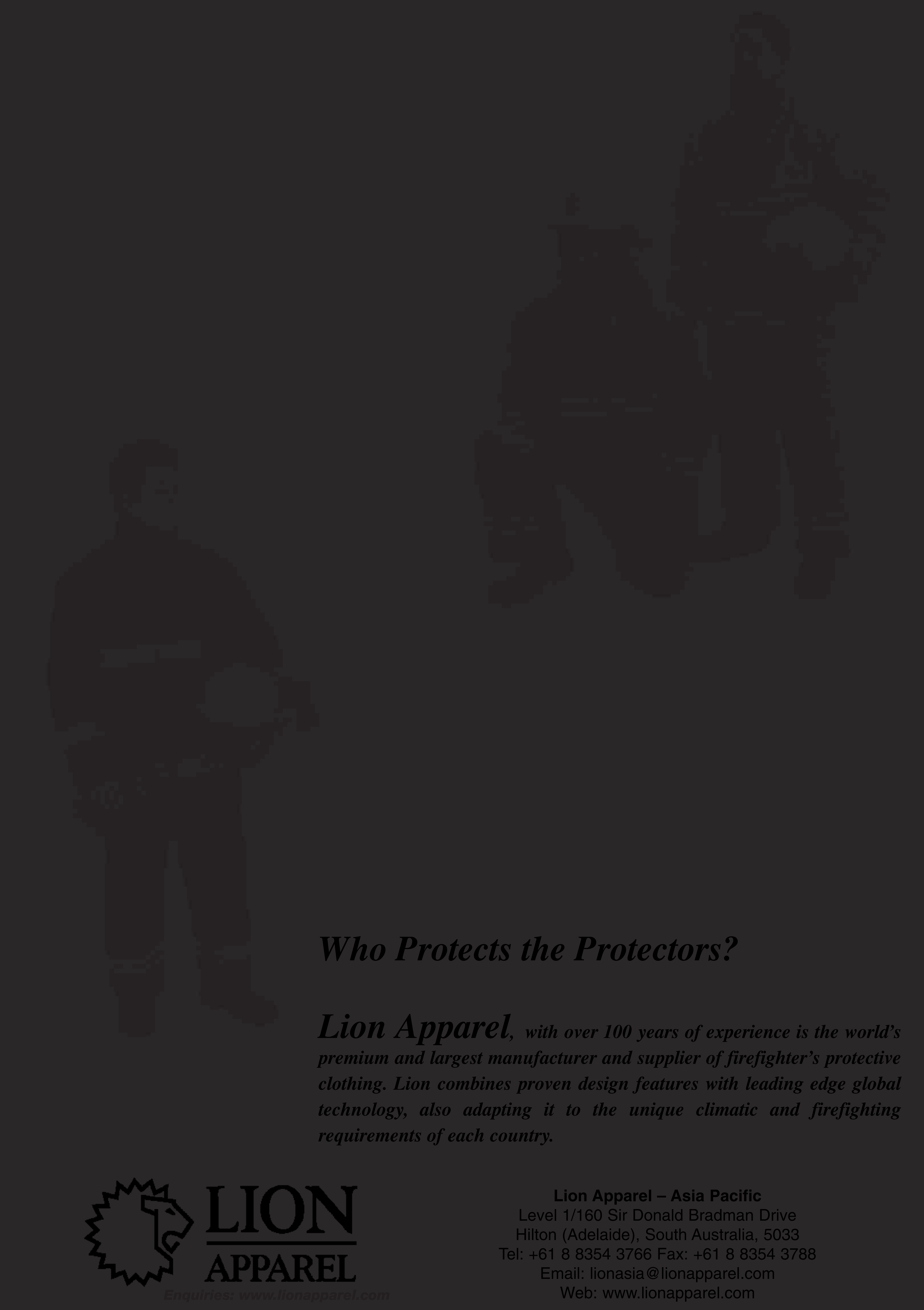

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Front cover picture: An RAAF Student tackles a flashover fire within the aircraft simulator

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FOREWORD

by Jeff Godfredson

NFPA's Asia-Pacific Operations Director

AS I REFLECT on my past career and compare it to the challenges facing the fire industry today I feel that it is different but in many ways unchanged.

Unfortunately my previous comments in this column regarding the fire risks presented by unsafe practices in buildings used by the public have been horribly demonstrated to be true. The fires over the last few months in an Internet Cafe in China (24 dead), a Karaoke Bar in Indonesia (40+ dead) and a disco in Lima, Peru (30 Dead) show us all the challenge. The problems that were present in the Coconut Grove fire in Boston, USA in 1942 (over 500 dead) such as blocked and inadequate exits, lack of fire suppression/detection equipment, lack of training of staff, overcrowding were issues in these most recent fires. We all know the problems and solutions (adoption of a good code such as NFPA 101 and enforcement). What is missing is a will or capacity to tackle the difficult issues. Unfortunately these fires will continue to occur and the numbers of dead will continue to climb.

For those managing Fire Departments in this changed world there is a need for more sophisticated equipment and technology to deal with the new problems caused by terrorism and similar threats. These purchasing decisions present the universal problems of scarce resources and conflicting needs. A few years ago I was in New York City and spoke to the NY Fire Department about these issues. They aimed to select equipment which had multiple uses and which would improve performance in daily activities. An example is HAZMAT identification equipment. Rather than being specific to one or two agents they selected equipment, which could be used to identify a broad range of chemicals. Improved decontamination capacity has application for "ordinary" HAZMAT incidents as well as those involving weaponised agents. It is possible for fire departments to improve their quality of service to their citizens in day-to-day incidents by preparing for the worst.

Gone forever are the days when a single agency could cope with any event, which occurred in their community. The nature and scale of events in the societies in which we live have made this a fact of life. Also the lines of jurisdiction are now blurred. No longer is it a clear-cut division between a crime and a fire/rescue. Events such as the Sarin gas attack in Japan, Oklahoma City Bombing and September 11th attack on NYC clearly demonstrate the scale and complexity of such incidents.

It is easy to envision events, which would quickly overwhelm local and state resources. Such "what ifs" must be thought through, exercised and critiqued in a trusting and learning environment. Only then will the emergency responders be able to maximize their limited capabilities.

The time to be thinking about these issues is now, not after the incident has occurred. Then there is a need to practice, practice and practice. Particularly interagency and Command and Control. There is a need to think beyond conventional boundaries. Resources may come from other agencies, military, private sector and other countries (many countries are now developing Urban Search and Rescue Teams with the capacity to be deployed both within their own country and offshore).

Who will pay, who will be in charge, how are these resources to be sourced; these are all questions, which need answers now. There is also a need to explore interoperability of equipment from various sources.

The fire service has met these challenges in the past and will continue their best efforts for the well-being of the citizens who they protect.

Jeff Godfredson
NFPA's Asia-Pacific Operations Director

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RAAF Security & Fire Services ADF Fire Training School

by Mat Lock

Student tackles an undercarriage fire scenario

CHUBB FIRE AUSTRALIA has successfully supplied a state of the art fire training complex for the RAAF in Queensland. Chubb partnered with International Fire Training Equipment Ltd (IFTE) to provide the new fire simulator training facilities at the Royal Australian Airforce base at Amberley, near Brisbane. IFTE is a UK based company specialising in the design and manufacture of fire training simulators.

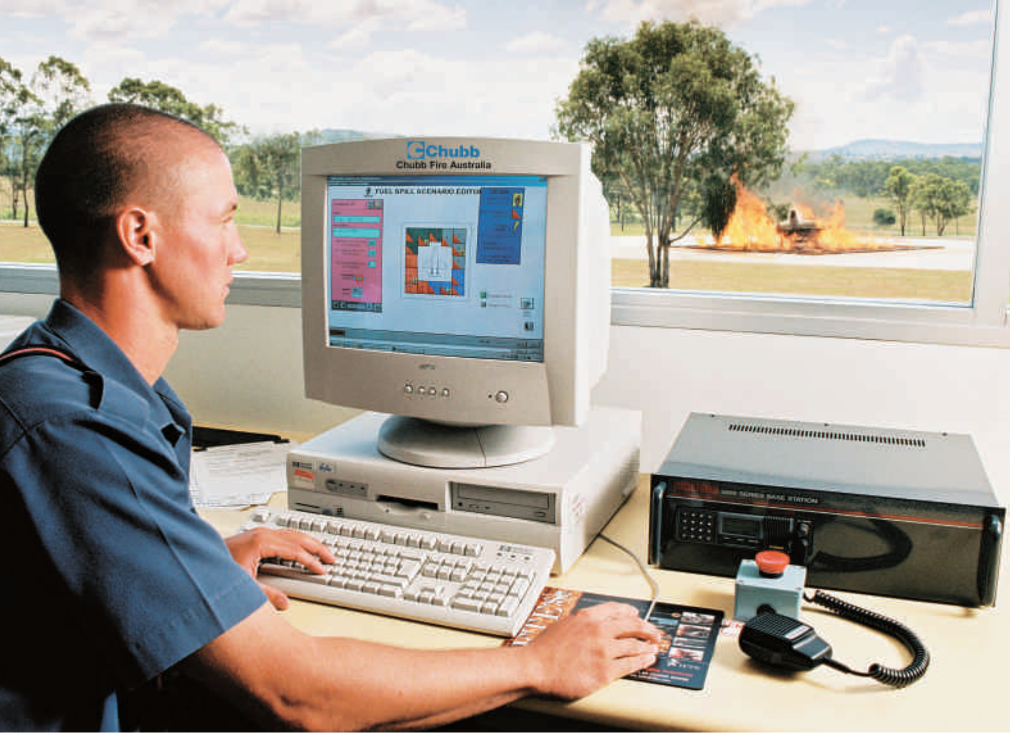
The site represents the most sophisticated LPG training facility in the world and utilises patented technology to recreate a host of training scenarios for aviation, industrial and domestic fire environments. The total cost of the project was in excess of $10 million incorporating the new training facilities and associated infrastructure.

All fires are fueled by LPG Propane, a safe and environmentally acceptable alternative to conventional carbonaceous or hydrocarbon fuels, and are controlled through a centrally located computerised control centre. To further limit the impact of the RAAF training on the environment a unique media simulation system was developed. This facility is the first in the world to actually utilise the system. In addition to the improved environmental position it also helps to reduce training costs.

The training facility comprises of three separate trainers and was installed using Chubb's project management experience:

- **An aircraft simulator** – similar in design to a Boeing 737 (22m in length/3m in diameter) with internal seat, storage and flashover fire scenarios and external wing engine and undercarriage fires. Features include accurate door sill and wing heights for realism of ladder entry training, a representative undercarriage simulation and internal collapsed flooring to simulate a crashed aircraft.
- **A fuel spill simulator** – covering an area of 150m^2 with a mock FA18 fighter jet located in the centre. The instructor is able to "grow" the fire across the area and, when fully alight, the flame height in the centre will reach a minimum of six metres. A series of special detectors located within the fuel spill enable the RAAF training staff to monitor the competence of the student applying the media, thus providing accurate data to support debriefing exercises.
- **A structural fire trainer** – a two storey building. Designed to enable compartment fire training the lower floor provides an industrial unit scenario whilst the first floor simulates office or domestic scenarios, including a flashover scenario. IFTE developed a unique hand-held extinguisher trainer whereby all generic forms of media are simulated through the use of recycled water. The control system will recognise which extinguisher the student has selected together with the success rate of its application.

A sophisticated control system represents the crux of the safety systems and ensures that all scenario parameters and allied safety systems are utilised to enable the safe yet realistic



The crux of the operating system

training to commence. The computer enables the system to automatically control the size and signature of the flame whilst detecting the type and quantity of media applied.

"Chubb and IFTE have taken the RAAF's 'wish list' for a fire fighter training ground, designed, developed and then implemented the system to meet our specific needs, then followed this up with operator training and maintenance. The system has increased the efficiency and safety of our training in addition to significantly reducing the environmental impact of our live fire training," said Damian Reitsma, Officer in Charge, Fire Training Flight, RAAF Security and Fire School.

The operating system is capable of electronically logging all fire scenarios' in order to compile a host of information for debriefing and OH&S purposes. These include the temperatures reached within a training compartment, the duration and intensity of the fire, the student's effectiveness in extinguishing the fire and other such critical data. A password protected, tiered level of access has been created within the control system to ensure that only trained operators are able to initiate fires. Such an access system enables un-trained staff to utilise the equipment's physical training opportunities, such as rope and ladder training, whilst rendering the fire elements of the site inaccessible.

The facility enables training in accordance with the Australasian Fire Authorities Council Standards and enables the graduate military fire fighters to demonstrate their absolute ability to remain cool and decisive in the face of a life threatening inferno or other emergency situation.

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"The inherent safety and controllability of the fire scenarios in the simulators have, for the first time ever, provided the RAAF with an excellent training tool. We can reproduce the same scenario over and over again to ensure fairness when assessing fire-fighter trainees or we can diversify and expand the scenarios to really test the knowledge and skills of the more advanced fire fighters. The system is user and environmentally friendly and has allowed us to triple the number of hot fire training scenarios we run in a day.

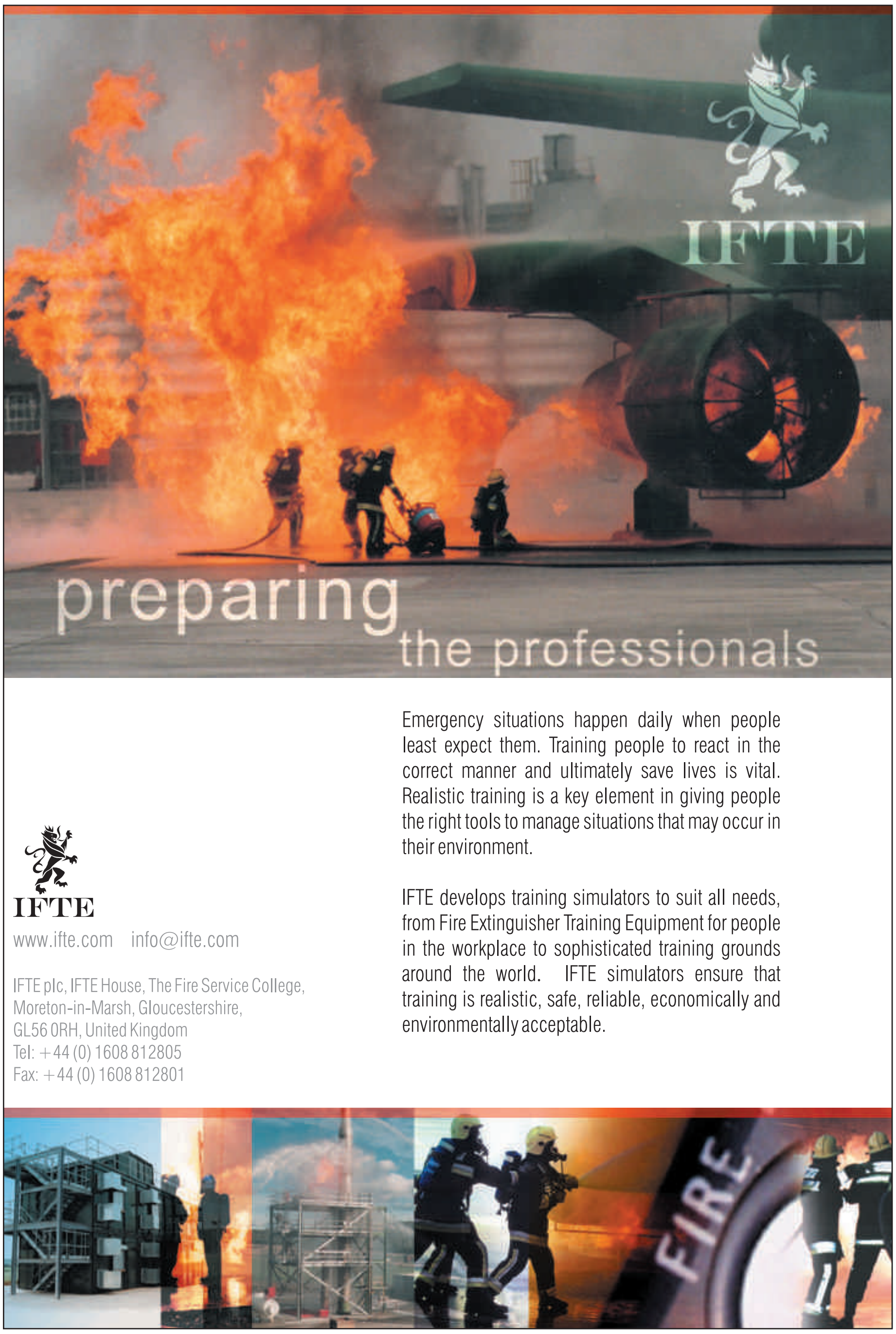
"The system is so flexible, that we can conduct training for anything from an individual learning to use of a branch for the first time, employing both branches and vehicle mounted monitors simultaneously, up to including several crews responding to a major aircraft accident. We can generate surprising realism and create the 'perception' of real danger for the fire-fighters under training, without sacrificing the actual safety of either instructors and/or trainees," said Damian.

CHUBB AND IFTE – THE WAY FORWARD FOR EMERGENCY TRAINING

Chubb's introduction of IFTE's capabilities to our shores comes in response to the RAAF's increased need to provide realistic fire and emergency training. However, this growing requirement is

An RAAF student tackles a flashover fire within the structural trainer

Student practices ladder entry techniques



Emergency situations happen daily when people least expect them. Training people to react in the correct manner and ultimately save lives is vital. Realistic training is a key element in giving people the right tools to manage situations that may occur in their environment.

IFTE develops training simulators to suit all needs, from Fire Extinguisher Training Equipment for people in the workplace to sophisticated training grounds around the world. IFTE simulators ensure that training is realistic, safe, reliable, economically and environmentally acceptable.

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Instructor maintains control of fire during exercise

shared by the entire fire community and the need for intense fire and security training is not reserved solely for the aviation and Defence industry. Chubb's partnership with IFTE enables provision of the ultimate in training for emergency service and rescue teams as well as fire, security and emergency planning departments.

IFTE has previously provided aviation simulator solutions in Asia Pacific, which include Changi Airport, Singapore Chek Lap Kok Airport, Hong Kong, Nagasaki Airport. In addition, a series of IFTE compartment fire trainers relevant to submarine, fire behavior and search & rescue training have been installed around other Australasian regions. IFTE recently launched the world's largest aviation trainer at Schiphol Airport, Amsterdam. The wide bodied, triple deck simulator is similar in design to a Boeing 747 aircraft and is complete with an 800m^2 fuel spill trainer, all of which is fuelled with LPG Propane.

By partnering with Chubb, IFTE ensures the solutions are installed and maintained to the very highest standard using the existing expertise and project management capabilities. By partnering with IFTE, Chubb enables its clients to meet the increasing regulatory and legislative requirements, helping to train professional emergency personnel and employees alike.

Mat Lock, National Product Manager for Chubb Fire Australia, has relocated to Australia after seven years with IFTE plc in the UK, to enable a more focused product support role within Australia and New Zealand. Considered an expert in this highly specialized field, Mat is helping to drive and deliver state-of-the-art emergency training to meet growing demand.

"Currently, most airports throughout Australia and New Zealand use fire simulators of varying degrees of sophistication. These simulators are not necessarily training fire fighters in all competency based aspects of fighting an aircraft fire," said Mat. "The IFTE aircraft fire simulation technology is the way forward for aviation fire training, with great potential for use by commercial airlines, ground crews and multi agency, major incident scenarios."

"During the past five years, Europe and the United States have seen a huge increase in the use of fire simulation solutions across numerous market sectors, including fire brigades, marine, aviation, petrochemical, industry and military applications. There can be no doubt that legislative influence, increased global security awareness and the public call for heightened preparedness will further the need for emergency service training solutions in the coming decade," said Mat.

"Every agency involved in emergency service and rapid response training has an obligation to provide safe yet realistic training together with an accountable and professional system that supports even the most stringent guidelines."

Chubb is a Registered Training Organisation and offers a wide range of nationally accredited courses and ongoing total preventative maintenance packages to ensure longevity of the client's investment. Originally, these courses were designed for mining, commercial industries and large corporate clients. Armed with this knowledge and a detailed understanding of the IFTE systems has enabled tailored operator training courses to be developed by Chubb. All Chubb instructors are fully qualified and experienced in their field of operations, and satisfy all requirements of the Australian National Training Authority.

"We have spent a lot of time researching and understanding the differences between the occupational health and safety legislation throughout individual states and countries. The courses we provide are of a quality that ensures compliance, without leaving anything to chance.

With legislation driving the need for building evacuation plans and procedures, emergency training is essential for all businesses. Through the advent of IFTE's solutions our training courses provided to small businesses and corporations include practical demonstrations and hands-on "hot" fire training to simulate the work environment", said Mat.

"Working as a national body, and in partnership with IFTE, Chubb is exceeding the demands and expectations for top-end training across all sectors. We are able to draw upon a global pool of highly specialized knowledge within IFTE and harness it with Chubb's facility management and training expertise. Given the increased focus on environmental considerations and health & safety legislation, it is likely that traditional methods of training will be replaced with solutions designed for modern day fire and safety training," said Mat.

Emergency situations occur daily and usually when people least expect them. Realistic training gives people the tools to react to a crisis in the correct manner and ultimately save lives. Fundamentally, the wide range of IFTE solutions represented by Chubb in Australia and New Zealand are helping to develop a safer working environment.

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Deck Monitors – from basic to state of the art

by Michael Peck

Picture courtesy of The Akron Brass Company

THE USE OF FIXED DECK MONITORS dates back to the beginnings of the earliest horse-drawn fire engines where a hose with a smooth bore nozzle was crudely fixed to the fire engine. Today's modern fixed deck monitors take several forms and offer several options, which were not available just a few generations ago.

FIXED DECK MONITORS

The earliest monitors consisted of a split waterway design leading to a 'T' joint to which the nozzle was attached. The original monitors had limited movement and relied on the fire-fighting vehicle being positioned correctly at the fire scene so the stream could be directed accordingly. This quickly progressed to monitors being able to offer 360° horizontal and varying degrees of vertical control. Control of these axes were either by a friction lock or by a gear allowing the firefighter to direct the water stream then lock the monitor in the new position. Typically the flanges were 2″ or 2½″ 4 bolt ANSI 150 lb.; however, other sizes were available in addition to having the inlet of the pipe threaded to accommodate a NPT thread which is still the case today.

Today's monitors tend toward single waterway Deck Monitors with flows up to 1250 GPM and 2000 GPM offering 360° horizontal and 150° or more vertical travel. Both tiller bar and gear controls are offered depending on the application and space available for control of the monitor. Most manufactures offer Pyrolite (anodized aluminum) or brass monitors depending on the application specified.

One hybrid of the fixed monitor is the use of a lift-off portion of a portable monitor in conjunction with a fixed flange. This feature offers the best of both worlds for the fire service today. The ground base for the portable monitor can be safely stowed in a compartment until required, whereas the lift-off portion remains securely fastened on the deck of the fire truck ready to be used as a fixed monitor. Other developments in recent years have seen the introduction of a manually installed pipe to extend the height of the deck monitor enabling it to clear any obstacle on the deck of the vehicle and to offer easier operation for the firefighter. A further enhancement to this feature is a deck monitor with a

Picture courtesy of The Akron Brass Company

Picture courtesy of The Akron Brass Company

Picture courtesy of The Akron Brass Company

built-in elevation feature to increase the height of the deck monitor. This is accomplished by the firefighter engaging a safety mechanism, which allows the firefighter to extend the height of the monitor without the need for any extra plumbing to clear any obstructions on the deck of the vehicle. Some manufactures offer an electrical version of this feature complete with remote controls.

REMOTE CONTROLLED DECK MONITORS

The late 50's and early 60's saw the development of the first remote controlled deck monitors. These were basically manual deck monitors that had electric motors installed in place of the gear mechanisms and have to be maintained on a regular basis. The flow rates of these monitors were similar to those for manual fixed monitors. The Remote Controlled Deck Monitors of today offer a wide variety of options for today's firefighter and can achieve flows greater than 2000 GPM. Vertical and horizontal controls have been joined by features such as stow and deploy, automatic elevating capabilities, obstacle avoidance programming, limited oscillation and a wide variety of control packages from toggle control boxes to sophisticated joystick and tether controls. Electrical Self-Elevating Monitors are also a new feature in recent years, eliminating the need for special plumbing below the vehicle deck. Elevation of the monitor is controlled by the pump operator from the console in the vehicle or a control at the pump panel allowing the operator better visibility of the water stream from the elevated deck monitor. Another option, in recent years, is a control package incorporating an electric valve the operator can control from the control box for the monitor without having to purchase separate controls.

PORTABLE MONITORS

As long as fixed deck monitors have been in the fire service, firefighters have looked for a way to get the fire-fighting vehicle as close to the incident as possible to use the fixed deck monitor effectively. This is often a significant safety concern for both the vehicle and the firefighter. But with portable monitors, the firefighter had a product he could attack the fire and safely throw large volumes of water on the fire.

Today's modern portable monitors have their beginnings in the early 20's. By the 30's several companies had developed one, two, three, and four inlet Multiversal portable monitors. These products were normally manufactured from brass and offered to the fire service in polished bronze or plated finishes. Their heavy construction and the number of hoses connected to the portable monitors of the time ensured stability of the product when operating. In general, the monitors of that period were heavy, bulky, and difficult to set up and seldom utilized.

By the mid to late 50's brass portable monitors started giving way to the newer lightweight portable monitors made from Pyrolite (anodized aluminum). This gave the firefighter a newer lightweight portable monitor to combat the fire. The significant weight reduction and the vastly improved designs gave the firefighter a portable monitor that was quicker and easier to set-up. The improved designs led to greater flows and reaches enabling the firefighter to attack the fire more aggressively than before. The monitors of today come in two basic configurations. Dual Inlet Monitors with 2½″ (sometimes 3″ or 3½″) inlets with independent clappers to allow the use of a single hose, and Single Inlet Monitors with 4″ or 5″ inlets, offered in either with threads or Storz inlets. Most manufacturers offer a variety of inlet and outlet thread types to accommodate varying requirements from the international marketplace, including BSP, BIM and Storz. These monitors have flows ranging between 800 and 1250 GPM, and all manufacturers offer a full range of master stream nozzles and discharge tips for varying firefighting applications.

Picture courtesy of The Akron Brass Company

Some of today's portable monitors offer the added benefit of being used as both a portable and fixed deck monitor on firefighting vehicles. The upper waterway (or lift off portion) of the monitor is secured to the ground base by a locking mechanism (different manufacturers have locking methods unique to their own product), which can be disengaged by the firefighter. The lift off portion can be handed down from the deck of the fire truck and securely attached to the ground base for portable mode applications and more aggressive ground attacks. While in the deck mode the monitor is operated as a fixed deck monitor and can be rotated in the horizontal axis by the firefighter 360° and can offer vertical angles from 35 to 90°. When the monitor is in the portable mode, the scope of movement is lessened due to reaction forces encountered when in the ground configuration. Horizontal movement is limited to the manufactures design. However, the wider the angle of the horizontal movement the better, as it would require less repositioning of the portable monitor. Ideally a portable monitor should be able to achieve 180° of horizontal travel for maximum effect. Built-in horizontal safety stops offers the firefighter added safety, as they would prevent the firefighter from over rotating the monitor in the horizontal axis, which could cause the monitor to become unstable. For the vertical travel, a safety stop set at 35° will prevent the firefighter from lowering the elevation of the stream below a safe angle, which could cause severe reaction forces making the monitor unstable. The safety stop should only be used when the monitor is in the fixed deck position on the fire truck to travel below 35° to the monitor's lowest elevation angle. The monitor's portable ground base should also include ground spikes on each leg of the base to assist in the stability of the portable monitor while in the ground mode and being used on a variety of surfaces. The ground spikes should be self-adjusting to accommodate uneven ground surfaces, and should be repairable and replaceable as required. A safety chain and hook is also recommended to anchor the monitor to street grating or a suitable fixture to offer additional stability in the event of a pressure surge in the hose lay.

In conclusion, today's fire service has numerous options to choose from covering a wide range of specifications and of course a variety of price levels have to be factored in to any purchase equation.

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Hospital Fire Prot

By Craig L. Redfern, P.E., Rolf Jensen & Associates, Inc.

FIRE PROTECTION engineering for healthcare facilities requires a different approach than would be used for most other building uses. While the majority of occupancies depend on evacuation for fire emergencies, healthcare facilities must "defend-in-place". In using this approach, a greater dependence must be placed on life safety systems for protecting the occupants from fire. In the defend-in-place approach fire alarm, suppression and fire resistive construction all work together to avoid moving patients out of the building. Ideally any vertical movement of patients is avoided since it can be stressful, even dangerous, to the patient. Trained staff, familiar with emergency procedures are depended on to assist patients in a fire and move them to a safe area.

The definition of healthcare is important to determine how to apply the applicable codes. The National Fire Protection Association (NFPA) 101, 2000 edition, *The Life Safety Code* (LSC) is enforced most universally in the United States. Many jurisdictions also enforce a model building code, such as the *International Building Code* (IBC), which may contain additional, sometimes more restrictive, requirements. There are numerous definitions of healthcare, but the most basic involves sleeping accommodations for people incapable of self-preservation because of age, physical or mental impairment. This would include primarily general and psychiatric hospitals and nursing homes. Ambulatory healthcare is a related occupancy, but with less restrictive requirements. Other occupancies that may be associated with healthcare, but do necessarily require the same level of fire protection, would include doctor's offices, clinics and small treatment facilities. These latter building uses are typically treated as a business or other less restrictive use. As always, the Authority Having Jurisdiction (AHJ) must be consulted if there is any doubt about the occupancy.

Once it has been determined the overall occupancy is healthcare, typically there will be other occupancies in the same building. The LSC section 18.1.2.1 allows other occupancies to be applied in a building primarily used for healthcare along with the code advantages of that occupancy (for example the ability to reduce corridor width in a Business occupancy). However, the other occupancy must not be used by patients for sleeping, treatment or by those incapable of self-preservation. The occupancy must also be completely separated from healthcare by a 2-hour fire resistance barrier without penetrations other than self-closing fire doors in corridors. If this separation cannot be achieved, the most restrictive requirements for both occupancies must be applied. Further, if the non-healthcare occupancy is to be used for egress of healthcare occupants, the means of egress provisions for healthcare must apply throughout.

The LSC and model codes allow for some flexibility in applying the prescriptive measures in the code. Prescriptive referring to the specific instructions as outlined in the occupancy chapters of the code. LSC section 18.1.1.1.1 has an exception allowing the AHJ to approve an equivalency. Further, although the LSC does not require any specific method for achieving this equivalency, NFPA provides two methods to assist in evaluating alternate designs. The Fire Safety Evaluation System (FSES) and LSC Chapter 5 *Performance-Based Option*. As one would expect, each approach has its advantages and disadvantages.

The FSES for healthcare occupancies is detailed in Chapter 3 of NFPA 101A – *Alternative Approaches to Life Safety*. The FSES for healthcare first appeared in 1981 as an appendix to the LSC and now appears as a recommended practice. The FSES provides a method of "scoring" points for various life safety features of the facility. The resulting points are totalled and compared with the potential points for a facility in full compliance with the prescriptive portions of the LSC.

ection

Central Dupage Hospital.
Courtesy of RJA

If the facility can demonstrate that it has a point value greater than or equal to a traditionally compliant facility in four major categories, then equivalence has been demonstrated. The four major categories evaluated are Fire Containment, Fire Extinguishment, Emergency People Movement and General Safety. Since fire sprinklers are required for new healthcare occupancies, a large score of 10 points is included for fully sprinklered smoke compartments. This makes the FSES very difficult to compensate for a lack of sprinklers. Other major components of the FSES include protection of hazardous areas, corridors and vertical openings.

The approach provided in LSC Chapter 5, *Performance-Based Option* is a new section to the LSC and provides specific goals and objectives without prescribing how to achieve them. Although some designers fear this is "throwing away the code", Chapter 5 still requires some prescriptive code provisions be retained. The means of egress requirements for stairs, ramps, doors and lighting as well as other provisions must be incorporated in the design. However the chapter primarily focuses on selection and evaluation of specific fire scenarios. Based on criteria agreed upon by all parties, challenging but realistic fire scenarios are evaluated. The scenarios provided attempt to evaluate predicted response of the building systems and personnel to a given fire event. Perhaps the most exciting aspect of the Performance Based Option is the tools and the method can be used to evaluate fire and non-fire events. By changing the scenarios to address non-fire emergencies, a variety of design issues can be evaluated. With recent tragic events, evaluating the response of facilities to a variety of disasters has become essential.

A note of warning is appropriate when using alternate code approaches and equivalencies. Hospitals tend to have multiple, overlapping AHJ. The Center for Medicare and Medicaid Services (CMS), The Joint Commission on the Accreditation of Healthcare Organizations (JCAHO), State health agencies and local fire departments are some of the important parties to consider. An approval by one AHJ does not constitute an approval by all parties in that role. All authorities responsible must approve any alternate approaches before it can be considered an acceptable equivalency. Since LSC Chapter 5 *Performance-Based Option* is new, many jurisdictions are not prepared to evaluate this method and may need to have a third party review of the documentation. The use of alternatives must be addressed early in the design process and include all stakeholders.

Another situation commonly encountered in existing hospitals is areas that do not comply with the LSC for existing healthcare occupancies (LSC Chapter 19). Additions to non-complying areas must be completely separated by a 2-hour fire resistance rated barrier, without communicating openings other than fire rated corridor doors. When renovating an area, LSC Chapter 18 (new construction) applies to that area and unless the renovation is minor, applies to the entire smoke compartment. There is no set "trigger point" to determine when a renovation is large enough to require an upgrade to the entire smoke compartment. The AHJ will determine when a renovation is considered minor and involves the entire compartment. This determination should be made early in the design process if there is any doubt about required upgrades.

The requirements for 2-hour fire resistant barriers lead to some interesting design approaches by facilities. Many hospitals surround all new construction and renovation projects with 2-hour firewalls without evaluating the adjacent space. This approach leads to some very confusing and expensive wall arrangements. It is not unusual when a life safety evaluation is performed on an older facility, to find many firewalls that no longer appear to serve any purpose. These walls can be de-rated and significantly reduce maintenance and renovation costs.

As a defend-in-place structure, the goals and objectives are stated in LSC section 18.1.1.2. Primarily the intent is to limit the fire to the room of origin reducing the need for occupant evacuation. This goal is achieved with a total concept of design, construction and maintenance. The LSC further elaborates that the total concept is achieved with three major parts. The first part is also the last line of defense: Construction and compartmentation. The second part is detection, alarm and suppression. Third part of the total concept is fire planning and prevention. Section 18.7 details the operating features of the building including fire drills and maintenance of fire protection features. The primary focus of the LSC, however, is the second and last lines of defense. In other words, the design team must assume the worst case – a fire has started.

The LSC requires all new healthcare facilities to be sprinklered and existing facilities based on height and construction type. Quick-response sprinklers are

Northwestern Medical. Courtesy of RJA

Hospital Fire Protection

required in new sleeping smoke compartments to achieve the highest level of protection. The code does allow alternate protection methods to be substituted for sprinklers if the AHJ has prohibited sprinklers in a specific location. This is most common in electrical spaces. The code further requires protection with a fire alarm system for new or existing healthcare facilities. Sprinkler flow alarm switches, manual fire alarm boxes or smoke detectors would activate the fire alarm system. Smoke detectors are required in nursing home corridors or where hospital corridors have certain open spaces allowed. The LSC requires emergency forces notification on fire alarm, but allows a 120 second reconfirmation feature to be programmed into the fire alarm for smoke detection. As more reliable smoke detection technology develops, reconfirmation should become obsolete.

The last line of defense for the building is fire rated construction to limit the spread of fire and protect from structural failure. This is achieved by requiring minimum structural fire resistance based on the building height. The model codes further add limits to area based on structural fire resistance and sprinkler protection. Another level of protection is gained through compartmentation. Such that, each floor is divided into smoke compartments no larger than 22,500 square feet. The walls separating these compartments are one-hour fire and smoke rated construction. A minimum of two smoke compartments are required on any healthcare floor providing a safe place to relocate the occupants without the need to use stairs.

The patients are further separated from potential fire effects by corridor construction. In sprinklered new or existing hospitals, the corridors are not required to be fire rated, rather just resist the passage of smoke. These non-rated corridor walls may even terminate at a lay-in ceiling provided the ceiling would resist the passage of smoke. In the case of existing non-sprinklered hospitals, the corridor walls must be 30-minute fire rated and extend through any suspended ceilings. The doors to the corridor accessing the patient rooms are not required to be fire rated. In fact the LSC now specifically states compliance with NFPA 80, *Standard for Fire Doors and Fire Windows* is not required. Further the LSC allows up to a one-inch gap at the bottom of the door. This recent wording has been added to clear up a source to confusion for enforcing authorities and designers alike. In order to be a tested fire rated door, it would have to have a self-close feature. It has been considered that self-closing patient room doors may add to confusion when staff are trying to evacuate patients in a fire event and so are undesirable. Self-closing hardware is required any fire rated wall opening.

The areas in hospitals that represent a significant hazard because of fire loading or likelihood of ignition must be separated from patient care areas. In new facilities sprinklers are required in all locations and where the hazard is severe a one-hour fire resistance must also be added. Section 18.3.2 defines hazardous areas or in some cases refers to other standards for guidance. Some examples of hazardous areas include Paint Shops, Laboratories, Soiled linen rooms and storage areas. For existing facilities, these hazardous areas can be sprinklered and smoke tight with self-closing doors OR one-hour fire rated. The LSC further allows the use of domestic water sprinkler systems as described in section 9.7.1.2 for protecting existing isolated hazardous areas. Basically, up to six sprinklers can be used to protect an isolated hazardous areas piped directly from the domestic water system. The system must be capable of providing a water density of

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Texas Children's Hospital. *Courtesy of RJA*

0.15 Gallons-per-minute per square foot of area. If more than two sprinklers are used, water flow detection must be included and sound an alarm or notify a constantly attended location. This provision allows existing facilities to protect areas without the major expense associated with a complete sprinkler upgrade. Domestic water sprinkler systems still require engineering and careful consideration of the hazard involved.

This has been just a glimpse of some of the issues confronting the design team for hospital fire protection. Hospitals require constant evaluation of life safety readiness and reaction. Fire drills are required quarterly for each shift to maintain readiness. The required staff training as well as the multi-leveled total concept approach has had a major impact on healthcare fire safety. According to NFPA Statistics on facilities that care for the sick, between 1994 and 1998, there was an average of 5 civilian fire deaths in an average of 2,600 structure fires per year. That accounts for 0.1% of the civilian structure fire deaths in that period. This is an admirable record and is clearly a result of the total concept approach to hospital fire protection.

References:

National Fire Protection Association (NFPA) standards:

80 – Standard for Fire Doors and Fire Windows

101 – Life Safety Code

101A – Guide to Alternative Approaches to Life Safety

The U.S. Fire Problem Overview Report Leading Causes and Other Patterns and Trends Facilities that Care for the Sick – Marty Ahrens (NFPA) June 2001

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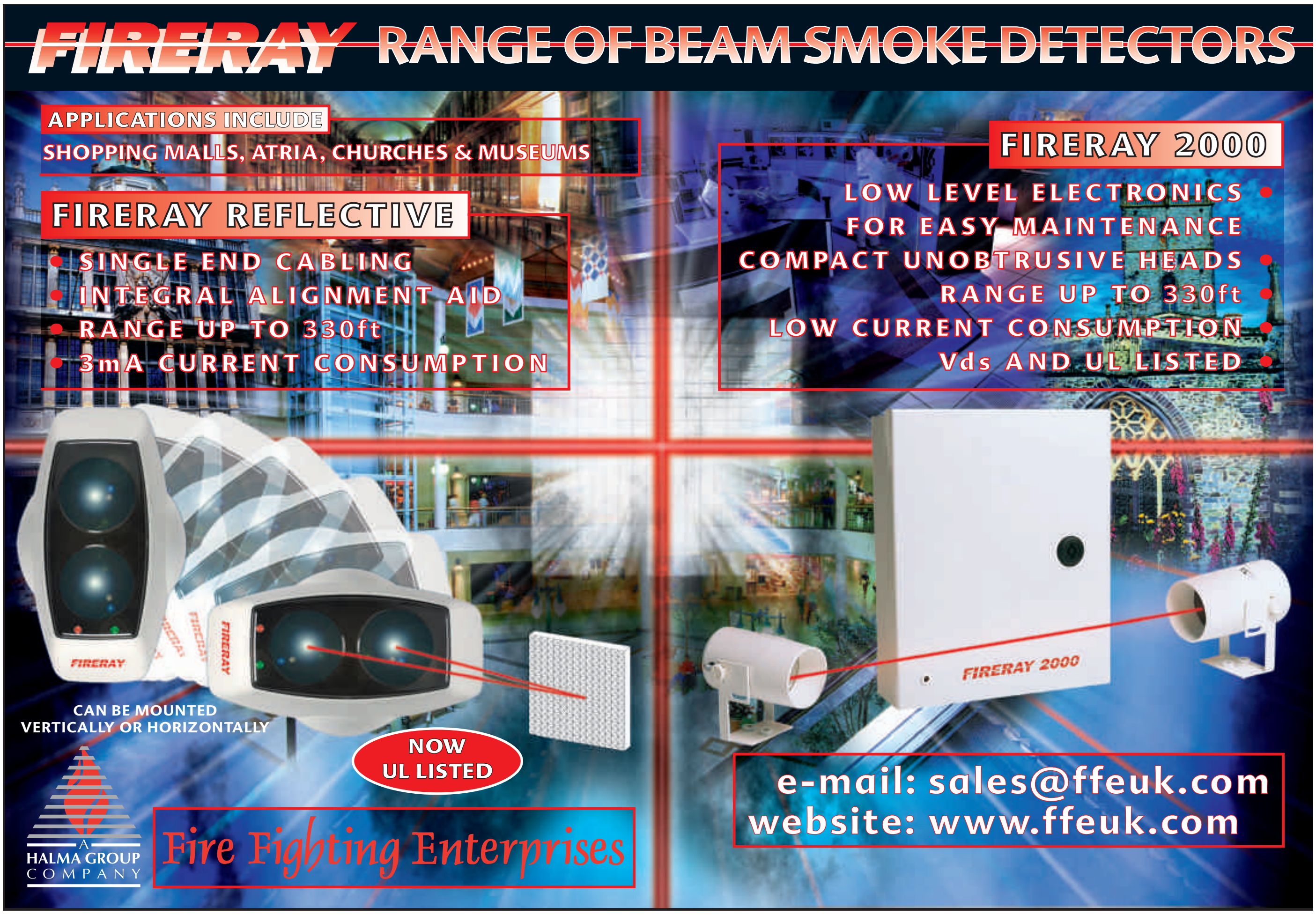

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Water capacity: 11,000 ltr
Foam capacity: 1,280 ltr
Foam monitor with dual output: 3,000 ltr/5,000 ltr

Also, SIDES is manufacturing an S 3000.10/VMA 123 type for TAN SON NHAT the Airport of Ho Chi Minh city in Vietnam on a 6x6 MERCEDES chassis.

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Assisted foam monitor – output: 4,500 ltr

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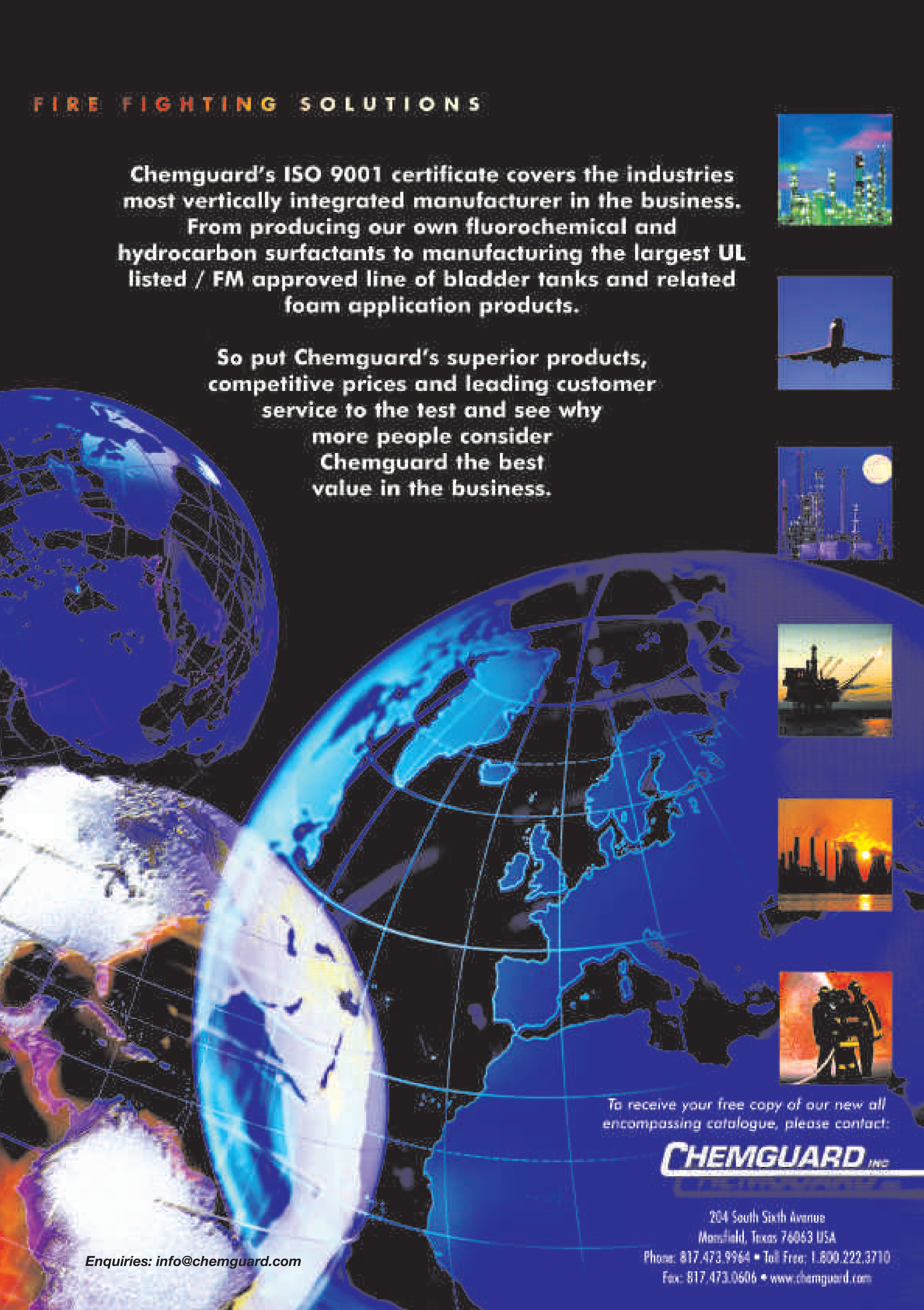

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Environmental Advantages as 3M Exits the AFFF / AR-AFFF Market

By Dr. Kirtland Clark

Picture courtesy of Chemguard, Inc.

THE EXIT OF 3M from the fire extinguishing market has sent a shock wave through the industry. 3M had such a big presence for such a long period of time that much of the market knew only their products. For instance, 3M had the military bid for over 12 years straight. Without question, 3M sold quality products, *but products with a very high fluorosurfactant content.*

3M argued for years that the high fluorine content was necessary to assure AFFF product performance. However, it is now very clear that although fluorosurfactant is certainly a necessary component of AFFF agents, the quantity used by 3M was excessive. One could ask, "**How do you prove that the fluorosurfactant level was excessive?**" The most direct proof is to compare the fluorosurfactant content of 3M products with various competitors' products, which meet the same specifications.

Fluorine Content of US Military Listed AFFF Agents

Let's first compare the fluorine content of US Military Listed (Mil-F-24385, QPL) products. Since these are highly competitive products developed to meet a difficult specification and independently tested by a government agency, it is automatically understood that no manufacturer uses more fluorosurfactant than necessary to do the job. 3M's FC-203CE listed 3% has 2.1% fluorine content while, Ansul's AFC-5A has 1.1%, Chemguard's C-301MS has 1.0%, and National's Aer-o-Water 3EM has 0.8% fluorine. Note that all competitive products have from 52-38% of the fluorine content of 3M's product, yet all products meet the same comprehensive performance specifications. It must be concluded that **all the competitive products are more fluorine efficient than 3M's product!**

Fluorine Content of UL Listed AFFF Agents

Let's further compare the fluorine content of 3% UL Listed AFFF agents; the bread and butter products of the industry. 3M's FC-203A contains 1.7% fluorine, while National's Aer-o-Lite contains 0.4% and Chemguard's C-303 contains 0.3% fluorine. Again, these products all meet the same fire performance specifications.

Fluorine Content of UL Listed AR-AFFF Agents

Comparing the fluorine content of 3X3 UL Listed AR-AFFF agents gives us a similar picture. 3M's product, ATC-603, contains 2.9% fluorine, while Ansulite 3X3LV has 0.9%, National Gold has 0.8% and Chemguard's Ultraguard and C-333 have 0.4% and 0.2% fluorine, respectively.

Why do such extreme differences in fluorine efficiency exist?

3M were the first to enter the commercial AFFF market in the early 1970's. Having a basic patent (Francen 1971) on the AFFF concept, 3M essentially held competitors out of the market for almost 5 years. As a chemical manufacturer, 3M was basic in the manufacture of fluorosurfactants going into their own products and formed a tight grip on the AFFF market. In the late 1970s, CIBA-Geigy Corp. (now CIBA Specialty Chemicals) challenged 3M's patent and entered the AFFF market by selling fluorosurfactants to Ansul in the USA. CIBA's challenge of 3M's patent was generally upheld by the courts hearing the cases, thereby opening the AFFF market to other foam manufacturers.

CIBA earned the right to compete through the courts, but still had to

Comparison of 3% AR-AFFF – UL Type III
Ultraguard (0.4%F) & C-333 (0.2%F)
Class B Topside – Heptane – 2.0gpm – 50 ft.^{2}

UL Verified Data		Fresh Water		Sea Water	
	Spec.	Ultraguard	C-333	Ultraguard	C-333
Control Time (Sec)	N/A	72	78	52	57
Extinguish Time (Sec)	<180	99	113	85	112
Torch 1		A	A	A	A
Torch 2		B	A	B	B
Burnback Area (ft.^{2})	<20	0.5	0	1.0	1.0
Expansion Ratio		8.6	6.5	8.7	6.5
25% Drain Time (min)*		17.0	11.8	9.5	7.8

A - **NO** candling, flaming or flashover throughout torch test.
B-Flashover occurred but extinguished within 30 sec.
* Used 1600 ml UL apparatus.

Table 1

develop AFFF agents that would sell against 3M products and still be profitable; not an easy task. Not being basic in fluorochemicals, CIBA had to develop more efficient fluorosurfactants and formulations to compete on a cost basis against the 3M products. As Director of Corporate research during this development effort (1982-1990), I can attest to the intense R&D program undertaken to challenge 3M in a marketplace, which they all but owned. For more than 8 years, CIBA conducted more than 10 weeks per year of fire tests at Ansul's test facility to develop some of the most fluorine efficient AFFF agents available at the time.

Early AFFF agent optimization efforts were concentrated on fluorosurfactant development. Except for 3M, by 1990 Ciba Specialty Chemicals and AtoFina supplied most of the AFFF market with specialized Lodyne and Forafac fluorosurfactants, respectively. Additional fluorosurfactant development proved only moderately beneficial toward improving fluorine efficiency after about 1990.

In 1989, National Foam obtained improved fluorine efficiency through the use of sugar based hydrocarbon surfactants known as *alkyl polyglycosides*. Most of National's key fluorine efficient products are based on this technology to this day. Little further progress was made until 1999 when Chemguard achieved even greater fluorine efficiency through the development of a new hydrocarbon surfactant *and* fluorosurfactant pair created solely for use in AFFF agents. Working together, these surfactants allowed the highest fluorine efficiency obtainable to date.

Low fluorosurfactant content AR-AFFF … performance?

Tables 1 & 2 present UL verified fire test data for Chemguard 3% AR-AFFF agents Ultraguard and C-333, with only 0.4 and 0.2% fluorine content. The similarity in the control and extinguishing times on heptane where both products were applied at 0.04gpm application rate is astonishing since C-333 has less than half the fluorine content of Ultraguard. The real performance difference in the products can be seen on isopropyl alcohol (IPA) where Ultraguard is used at 4.5 gpm, while C-333 is used at 4.9 gpm to get the same results.

Low fluorosurfactant content AR-AFFF … effect on environment?

After verifying that low fluorosurfactant content AFFF and AR-AFFF agents effectively extinguish fires, the most important issue becomes the effect these products have on the environment. Because they contain drastically reduced fluorosurfactant

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> José Ortega y Gasset (1883 - 1955)

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Picture courtesy of Chemguard, Inc.

levels, they *must* immediately be considered more environmentally acceptable. If we compare Ultraguard to 3M FC-603, the same quantity of each product would be required to extinguish a given fire, while FC-603 would carry 574% or 5.74 times more fluorochemical into the environment than does Ultraguard. Similarly, if the fire is extinguished with Universal Gold versus FC-603, FC-603 would carry 263% or 2.63 times more fluorochemical into the environment.

It must, therefore, be concluded that extinguishing Class B fires in the absence of 3M products will lead to much less fluorochemical entering the environment given the same number of fires since *all competitive products have lower fluorine content.*

Further, *all competitive AFFF and AR-AFFF products* are manufactured using telomer based fluorosurfactants and do not contain perfluorooctanyl sulphonate (PFOS) being targeted by the EPA. Therefore, the use of *all competitive AFFF and AR-AFFF products* on fires will not carry PFOS or it's derivatives into the environment; an important consideration.

Tables 3 & 4 give a comparison of environmental impact of Chemguard Ultraguard, C-333, 3% Fluoroprotein, 3% Protein and baby shampoo (Johnson's No Tears). Protein based products are often touted as being especially earth friendly, while AFFF and AR-AFFF agents are generally considered by environmentalists as undesirable. Certainly, everyone considers baby shampoo to be exceptionally mild. It can be clearly seen that 3% Fluoroprotein, 3% Protein and baby shampoo have by far the greatest oxygen demand, while still not having as large a BOD/COD ratio as the two AR-AFFF agents. Of most importance, 3% Fluoroprotein and 3% Protein had very large Total Organic Carbon (TOC) loading of 260 and 158 grams/liter, respectively, while baby shampoo had a low TOC of 14 grams/liter. Therefore, baby shampoo is much more environmentally friendly than either 3% Fluoroprotein or 3% Protein.

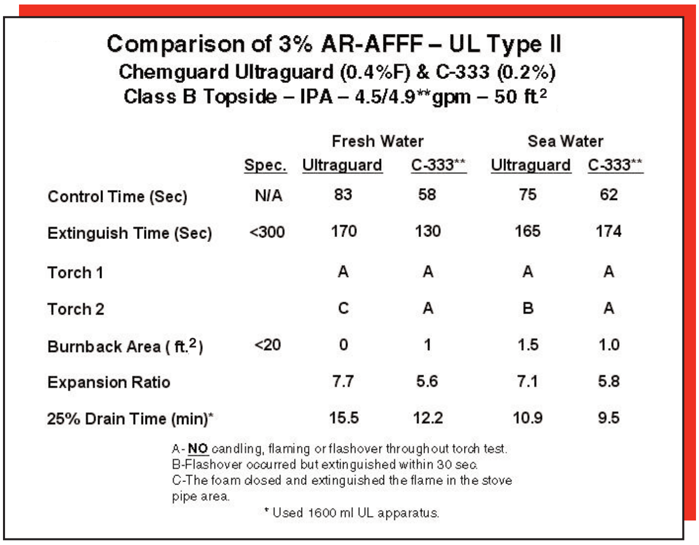
Clearly, the only AFFF agents on the chart, Chemguard Ultraguard and C-333, had the best environmental impact numbers. The low BOD and COD values and higher BOD/COD ratio assure that algae pluming is less likely to occur, while efficient biodegradation is assured. Further and most importantly, the TOC's were found to be lower than even baby shampoo, at 8.2 and 5.7 grams/liter, respectively. *Assuming this data obtained by Lancaster Laboratories is accurate, one must conclude that these AR-AFFF products are more environmentally friendly than baby shampoo, except for the known presence of fluorosurfactant.*

When is a fluorosurfactant content low enough?

I have clearly demonstrated that AFFF and AR-AFFF products left in the marketplace after 3M's withdrawal, extinguish fires effectively while having much lower fluorine content. I have further demonstrated that two Chemguard AR-AFFF products having 0.4 and 0.2% fluorine content perform well and have excellent environmental properties relative to even baby shampoo. The question however is . . . *Is this good enough? Or must the fluorosurfactant level be zero to be good enough?*

Logic would certainly say that the benefit obtained from such products, even if the 0.4% fluorine product was used, would assure their use without pressure from environmental groups. After all, the fluorine level is only 15% of the 3M product and the fire is still extinguished!

However, I think it is more likely that even C-333 at 0.2% fluorine will likely be rejected as too much by environmentalists. As would be expected of an AR-AFFF with such low fluorosurfactant content, C-333 has spreading coefficients of 4.3/4.1 in distilled/seawater and spreading on cyclohexane is tremendously slowed. Lower fluorosurfactant levels would yield foam agents, but non-AFFF (Aqueous Film Forming Foam) agents.



Comparison of 3% AR-AFFF – UL Type II
Chemguard Ultraguard (0.4%F) & C-333 (0.2%)
Class B Topside – IPA – 4.5/4.9**gpm – 50 ft²

		Fresh Water		Sea Water	
	Spec.	Ultraguard	C-333**	Ultraguard	C-333**
Control Time (Sec)	N/A	83	58	75	62
Extinguish Time (Sec)	<300	170	130	165	174
Torch 1		A	A	A	A
Torch 2		C	A	B	A
Burnback Area ($ft.^2$)	<20	0	1	1.5	1.0
Expansion Ratio		7.7	5.6	7.1	5.8
25% Drain Time (min)*		15.5	12.2	10.9	9.5

A- NO candling, flaming or flashover throughout torch test.
B-Flashover occurred but extinguished within 30 sec.
C-The foam closed and extinguished the flame in the stove pipe area.
* Used 1600 ml UL apparatus.

Table 2

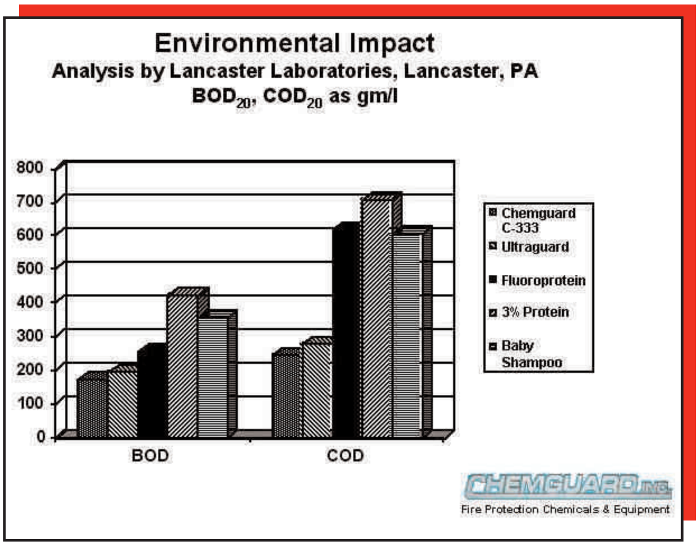


Table 3

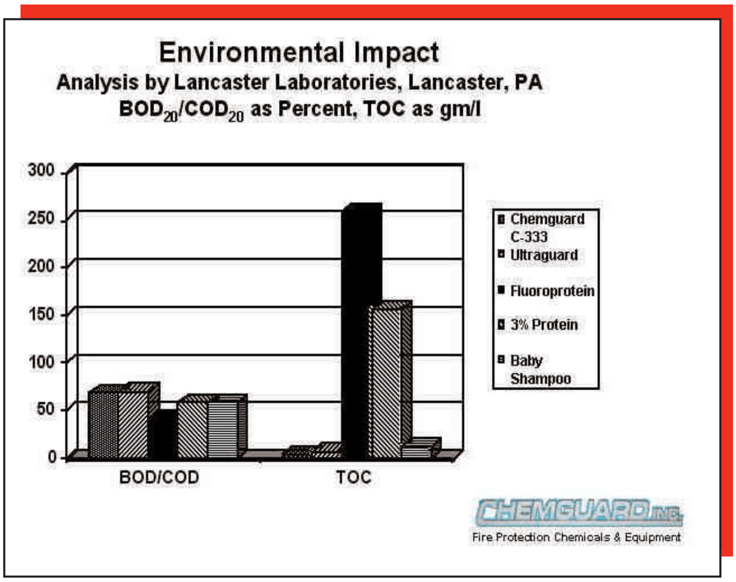


Table 4

Picture courtesy of Chemguard, Inc.

Can FluoroSurfactant Free Foam (FSFF) compete with AFFF agents?

Having C-333 type technology in production, one might think the next logical step would be an FSFF product. However, the development of an FSFF was difficult, requiring almost two years and more than 300 fire tests for optimization. A broad based patent application defining the products, was filed in October 2001. Fire performance data for two 3% FSFF agents (A&B) and one 3X3 AR-AFFF agent is given in Tables 5&6. Clearly, AFFF-type fire performance has been obtained from non- AFFF agents for the first time.

Unlike protein foams, FSFF agents are light yellow to almost colorless with a mild odor. Without fluorosurfactant, it is anticipated that environmentalists will welcome the new products. Time will tell!!

Dr. Kirtland Clark, vice president and head of Chemguard's R&D, holds a doctorate degree in physical organic chemistry from Brown University. While being the director of corporate R&D at Ciba-Geigy Corporation he directed the development of fluorochemical surfactants and AFFF and polar AFFF. He holds 17 US patents in the field of fluorochemical foam stabilizers, film formers and polar AFFF compositions.

During his tenure at Chemguard he has been developing fluorosurfactant and hydrocarbon surfactant compositions uniquely for fire fighting foams and FluoroSurfactant Free Foams®.

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Tokyo Fire Depart

By Denise Laitinen

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Test of a fire suppressing agent

In Tokyo, the low fire rate is a testament to a well-trained fire department and its citizens

The Tokyo Fire Department (TFD) has come a long way from the Edo period (1603 to 1867), when fires were put out by demolishing the burning building. Back then, the samurai acted as firefighters, and their wives wore red coats to stand out in the crowd and help evacuate people. Today, the fire department is the largest in the world, with 17,993 employees and a budget of US$2 billion (244 billion yen for fiscal year 2001.) Some 1,839 pieces of apparatus, including 20 firefighting motorcycles, are housed in 80 fire stations throughout Tokyo, which is composed of 23 wards, called "ku," 24 surrounding cities, 3 towns, and a village.

For a city of 12 million residents, or 10 percent of the entire Japanese population, Tokyo has a remarkably low fire rate. There are roughly 19 fires of various types and origin every day, or approximately 6,933 a year. In 2001, 4,044 of these were structure fires.

Although buildings in Tokyo are typically five to seven stories high, there is tremendous interest in building Tokyo up instead of out. As a result, the city has become a hodgepodge of soaring skyscrapers, high-rises, and one- and two-story dwellings. And with land at a premium, it's increasingly common for high-rises to be multi-use buildings.

The TFD Volunteers at drill

In the Shinjuku section of Tokyo, for instance, the lower floors of a 45-story high-rise contain restaurants, while several upper floors contain offices. On the 19th floor is a hotel lobby.

Among the companies investing millions in new multi-use buildings is Misawa Homes, which is spending $1.5 billion to develop twin 60-story towers containing offices and condominiums. Minori Mori, the biggest landlord in Tokyo with 88 buildings, plans to complete 17 new office buildings in central Tokyo in the next three years. The largest of the Mori Building Company projects is Roppongi Hills, a $2.1 billion office, cultural, and residential complex. Mori and other developers are betting that childless couples, the largest growing segment of Japan's population, will prefer to live in multi-use high-rises close to work and attractions than in the suburbs.

KEEPING BUILDINGS SAFE

One of the major codes that govern buildings in Tokyo is the Building Safety

ment

Law, managed by the Land, Infrastructure and Transport Ministry and enforced in Tokyo by the Tokyo Metropolitan Government. The other is the Fire Service Law, which has applied nationwide since 1948.

According to the Fire Service Law, a high-rise is a building 101 feet (31 meters) high – the length to which a typical fire department ladder extends – or higher. A building 101 feet (31 meters) tall is about 11 stories, and the Fire Service Law stipulates that buildings 11 stories or higher must be sprinklered. Office buildings, factories, apartment houses, schools, and warehouses 11 stories or less need not be sprinklered. However, fire prevention ordinances in Tokyo require sprinklers in buildings not governed by the Fire Service Law, including those with basements, windowless floors, and others.

Buildings 11 stories or higher must have emergency public address systems and emergency power outlets for firefighter operations. Automatic detection systems are required for high-rises above 11 stories, as well as lower, smaller buildings.

Multi-use buildings in Tokyo use three types of automatic detection systems: heat detectors, smoke detectors, and flame detectors, which sound alarms to alert occupants and send a signal to a safety center control room in the building.

Workplace managers are required to form private fire brigades depending on the square footage and occupancy capacity. Movie theaters, for example, including those in high-rise shopping centers, must have fire brigades if they're 107,642 square feet (10,000 square meters) or larger, or if they can hold 2,000 or more people. Multi-use buildings that cover 1,858 square feet (20,000 square meters) or more must also have a private fire brigade, the size of which is determined by the building's size. Japanese building codes are strict when it comes to protecting multi-use structures from fire, since they house different types of occupancies and a large number of unspecified people.

According to the Fire Service Law and the Building Standard Law, the authority to approve or disapprove construction in Tokyo lies with the city building supervisor or designated inspection specialist who must get consent from the Tokyo Fire Chief or one of the local station chiefs before he or she gives the owner(s) permission to build. Houses, built in unzoned areas, such as the suburbs, are exempt from this rule.

Even flame-retardant products inside multi-use buildings are regulated. According to Fire Service Law Article 8-3, high-rises, including the offices and residential units within them, and buildings used by a large number of unspecified people are required to have flame retardant items, such as curtains and carpets above the level set by the Cabinet Order. Officially approved "flame retardant materials" are marked by a white label with red "flame retardant" letters.

On the other hand, upholstered furniture, bedding and so forth isn't regulated by law, but is given approval by the Japan Fire Retardant Association, a private body. Items approved by the Japan Fire Retardant Association are designated as "flame retardant products." For example, officials encourage the use of such designated products for car covers, because arsonists often set fire to car covers in Japan.

SAFETY-CONSCIOUS CITIZENS

The Tokyo Metropolitan Government requires every workplace to have a disaster preparedness plan that includes safety drills, and building fire protection managers, who are often the building's owner, are trained in fire safety and disaster preparedness. Of the 780,000 workplaces in Tokyo, 330,000 must submit preparedness plans to the authorities. Though the others needn't submit their plans, they must be prepared, as fire department personnel visit workplaces regularly to make sure plans are in place and are being practiced. Safety drills are held every year, although the frequency differs according to the type of occupancy.

Public education and these repeated safety drills are key elements in maintaining Japan's low fire rate. The TFD relies heavily on educating its residents in fire safety and on changing behavioral patterns. This pertains not only to fire safety, but to disaster preparedness, as well. In fact, says Tokyo Fire Chief Tetsuya Sugimura, the departments "first priority is on earthquake preparedness, residential fire safety, and emergency medical services."

TOKYO FIRE DEPARTMENT AT A GLANCE

Personnel: 17,993

Budget: US$2 billion

Number of apparatus: 1,839

Includes: 20 motorcycles, 6 helicopters, 9 fireboats

Number of stations: 80

Number of ambulance runs in 2000: 575,690

Number of structure fires in 2000: 3,986

In 2000, the largest source of major fires were:

Arson, 38.3%

"Other", 31.5%

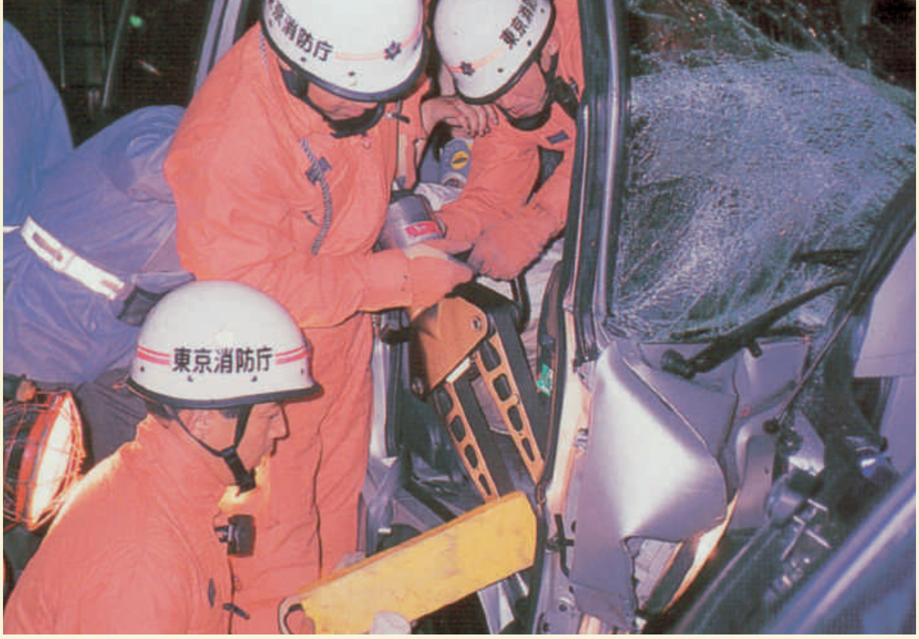
Smoking, 16.7%

Gas ranges and others, 9%

Playing with matches, 3%

Bonfires, 1.5%

Haz-mat members at drill


東京消防庁
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RTA extrication and rescue

Fifty-two fire stations in the city have a seismic meter, and every year on September 1, Japanese fire, police, civil defense departments, municipal governments, and residents participate in a national, large-scale safety drill focusing on earthquake preparedness, as well as weapons of mass destruction. This is hardly surprising when you consider that Japan experiences a large-scale earthquake about once a decade and has withstood seven quakes that measured more than 7.0 on the Richter scale since 1945. One of these was the Great Hanshin Awaji earthquake of 1995, which killed 6,000 residents of Kobe. A similar-sized earthquake is feared to strike Tokyo in the future.

After the Great Hanshin Awaji earthquake, TFD officials reviewed and strengthened all its disaster measures. Their goal is to prepare the city for disasters by encouraging officials to redevelop urban areas, particularly those in which wooden houses proliferate; secure open spaces; widen roads; and support the construction of fire-resistive buildings. Large water cisterns have also been strategically placed in important areas, such as refuge areas, to aid fire crews.

Preventing the fires that often erupt after an earthquake is one of TFD's most important disaster preparedness policies. Fire department personnel work with representatives of facilities using hazardous materials; chemical, electrical, and gas facilities; high-rises; underground garages; and tunnels to improve safety and eliminate fire dangers. TFD staff also inspect such facilities regularly and teach company employees how to put out fires and otherwise prepare for disasters.

In April 2001, the Tokyo Metropolitan Government's Earthquake Countermeasures Ordinance was enacted, encouraging office workers, building owners, and neighbors to rely on themselves in the initial aftermath of a disaster, cooperating with and helping each other. There are 24,434 trained volunteer fire corps members in Tokyo, who play an important role as leaders in the community.

Combined drill for the Emergency Fire Response Teams

Like fire officials elsewhere in Japan, TFD officials believe strongly that those at the scene of disaster can help contain a fire shortly after it ignites, preventing a small fire from becoming larger, and that they can help those in need of care. To this end, everyone applying for a driver's license in Japan must show proof that they've passed a CPR class, and fire department personnel work with fire corps volunteers and with every family in every neighborhood and every company in Tokyo to teach them how to extinguish a fire in the early stages.

Tokyo fire officials also train about two million people a year at three Life Safety Centers around the city run by the Tokyo Fire Department. The Honjo Life Safety Center, one of the three centers, cost 2.8 billion yen to build and is a virtual wonderland of hands-on fire and life safety training, open to the public free of charge.

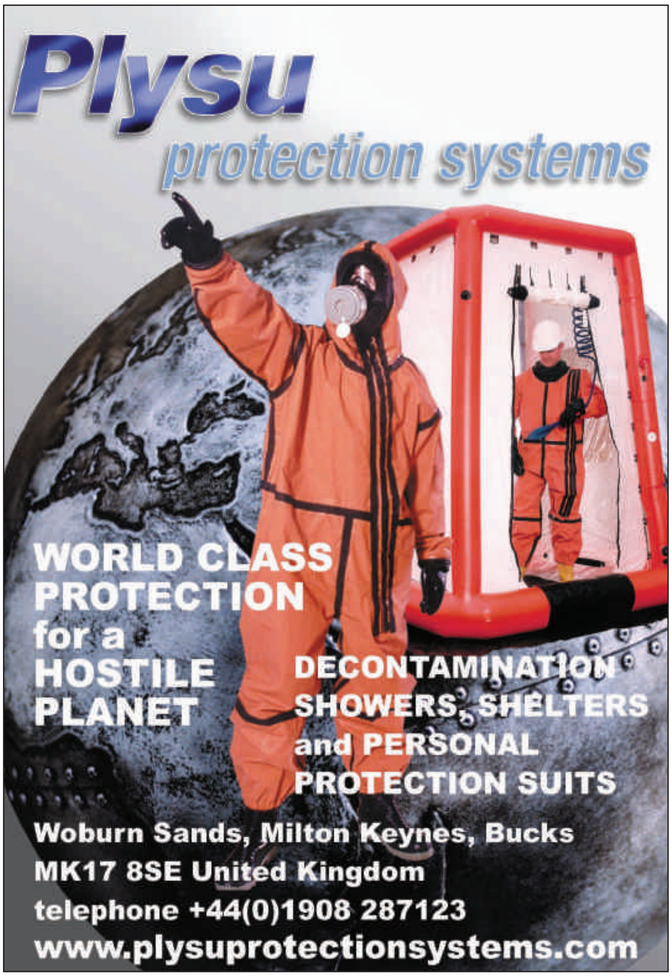
Visitors to the Life Safety Centers get experience putting out a kitchen fire in the firefighting training section, finding an exit while crawling through a smoke-filled hallway in the smoke maze section, taking appropriate action during an earthquake in the earthquake simulation section, and performing CPR in the first-aid training section. Daily training is provided to anyone interested, including schoolchildren.

All this is part of the TFD's seven-pronged Earthquake Countermeasure Promotion Plan, which also stresses the management of information to save lives and the deployment of specially skilled rescue crews. Technological innovations, such as pop-out electric outlets, have also been introduced to help reduce the threat of electrical fires after earthquakes, and a long-distance water supply system has been implemented to help control fire spread.

THE FUTURE

As the global source of cutting-edge electronic equipment, it may seem surprising that the Japanese rely more on people than technology when it comes to fire safety, but training remains key to the Tokyo Fire Department. "We continue to enhance volunteer fire corps capabilities, improve our citizens' ability to respond to disasters, and promote fire prevention," says Chief Sugimura.

Every year, the Tokyo Fire Department receives a million emergency calls, and fire service personnel perform about 570,000 ambulance runs, 60 percent of which are minor injuries. And department officials expect this number to climb dramatically in the next 5 to 10 years. The better-prepared people are to prevent fires and to respond effectively to disasters on their own, officials feel, the more effective fire crews will be when deployed to an incident.



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THERMAL IMAGING CAMERAS MARKET GUIDE

BULLARD

Manufacturer	BULLARD	BULLARD	BULLARD
Camera Model	**T3**	**TIx**	**MX**
Origin	USA	USA	USA
Manufacturers pedigree (year of first production TIC)	2001	1998	2000
Detector options	160 x 120 Amorphous Silicon Microbolometer	320 x 240 Barium Strontium Titanate	320 x 240 Vanadium Oxide Microbolometer
Battery life	2.5 Hours	1.5 Hours	1.25 Hours
Ambient temperature measurement available	No	No	No
Spot temperature available	No	No	Yes
Integral video telemetry available (approved frequency)	Yes (2 or 4 channel)	Yes (2 channel)	Yes (4 channel)
Weight ready for use (kg)	1.1	2.6	2.6
Dimensions	4.75″ x 4″ x 7″	12″ x 10″ x 6″	12″ x 10″ x 6″
Warranty	1 year	1 year	1 year
Local service centres available (Asia Pacific Countries Only)	No	No	No
Other features	Powerhouse direct charger, handle with transmitter, alkaline battery pack, carry case	Truck mount, glare shield, tripod, clamp, thermal throttle, 4″ screen	Truck mount, glare shield, tripod, clamp, temperature measurement, El mode, red hot feature, 4″ screen

Bullard
Tel: +1 859 234 6611
Fax: +1 859 234 6858
Website: www.bullard.com

CAIRNS ADVANCED TECHNOLOGIES

Manufacturer	CAIRNS ADVANCED TECHNOLOGIES a Div. Of Diversified Optical Products, Inc.	CAIRNS ADVANCED TECHNOLOGIES a Div. Of Diversified Optical Products, Inc.
Camera Model	**CairnsVIPER**	**Scout75**
Origin	USA	USA
Manufacturers pedigree (year of first production TIC)	3 Years	3 Years
Detector options	Microbolometer	Microbolometer
Battery life	90+ Minutes	Plug and Play
Ambient temperature measurement available	N/A	N/A
Spot temperature available	N/A	N/A
Integral video telemetry available (approved frequency)	Digital Spread Sprectrum – 2.4 GHz frequency band at an output power of 300mW, FCC part 15 approved & SAR compliant, capable of four channel operation and scrambled transmission. Receivers available include a compact case receiver and a vehicle-mounted receiver *OR* FM transmitter – Internal FM system operates at 2.4 GHz frequency band at an output power of 750mW FCC Part 90 approved & SAR compliant. Available scrambled or unscrambled	Digital Spread Sprectrum – 2.4 GHz frequency band at an output power of 300mW, FCC part 15 approved & SAR compliant, capable of four channel operation and scrambled transmission. Receivers available include a compact case receiver and a vehicle-mounted receiver *OR* FM transmitter – Internal FM system operates at 2.4 GHz frequency band at an output power of 750mW FCC Part 90 approved & SAR compliant. Available scrambled or unscrambled
Weight ready for use (kg)	5.75 lbs (2.15kg)	4 lbs (1.49kg)
Dimensions	7.13” wide x 13” long x 3.62” high	
Warranty	1 year from date of shipment from factory	1 year from date of shipment from factory
Local service centres available	No	No
Other features	2-Stage Intelligent Colour, 180o Rotating Display Thermal Management Bar	Remote Control Access Pan / Tilt

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Website: www.diop.com

E2V TECHNOLOGIES LTD

Manufacturer	E2V TECHNOLOGIES	E2V TECHNOLOGIES	E2V TECHNOLOGIES
Camera Model	ARGUS®1	ARGUS®2	ARGUS®3
Origin	UK	UK	UK
Manufacturers pedigree (year of first production TIC)	1992	1999	2002
Detector options	Pevicon Tube	BST	BST / ASI / VOX
Battery life	3 Hours	4 Hours	4 Hours
Ambient temperature measurement available	no	Yes	As standard
Spot temperature available	no	Yes	Yes
Integral video telemetry available (approved frequency)	External	External	Yes
Weight ready for use (kg)	2.7	2.2	1.8
Dimensions	330mm x 310mm x 150mm	330mm x 310mm x 150mm	122.6mm x 271mm x 162.6mm
Warranty	1 year	2 years	2Years
Local service centres available (Asia Pacific Countries Only)	Yes	Yes	Yes
Other features	® ARGUS is a registered trade mark of ARGUS INDUSTRIES Inc.	Times 2 Zoom, On Screen Time & Date ® ARGUS is a registered trade mark of ARGUS INDUSTRIES Inc.	Captures up to 15 pictures. X2 Zoom, On Screen Time & Date as standard – Worlds most advanced TIC. ® ARGUS is a registered trade mark of ARGUS INDUSTRIES Inc.

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Fax: +44 1245 453 724
Website: www.argusdirect.com

GB SOLO

Manufacturer	GB SOLO	GB SOLO
Camera Model	Solo Vision	Solo Tic
Origin	UK	UK
Manufacturers pedigree (year of first production TIC)	1994	1994
Detector options	Micro Bolomater	Micro Bolometer / FPA
Battery life	2.5 Hours	2.5 Hours
Ambient temperature measurement available	No	No
Spot temperature available	No	No
Integral video telemetry available (approved frequency)	Yes	Yes
Weight ready for use (kg)	650g	3.9
Dimensions	120mm x 150mm x 80mm	N/A
Warranty	2 Years (tbc)	Lifetime (Shell) 1 ear 1 year Camera & Electronic Components
Local service centres available (Asia Pacific Countries Only)	Australia, Thailand	Australia, Thailand
Other features	Worlds only hands free hand held. Worlds lightest Thermal Imaging Camera	Worlds only totally integrated Fire-Fighting Helmet incorporating TIC, SCBA, Communications and Helmet

GB Solo
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ISG

Manufacturer	ISG	ISG	ISG
Camera Model	Talisman	Surveillance X2	Spirit
Origin	UK	UK	US/UK
Manufacturers pedigree (year of first production TIC)	1994	1999	2002
Detector options	BST/Raytheon S200	Raytheon S200	AS2000 Core
Battery life	4 hr	5hr	4hr & 7hr
Ambient temperature measurement available	NO	NO	NO
Spot temperature available	YES	NO	YES
Integral video telemetry available (approved frequency)	YES	YES	YES
Weight ready for use (kg)	2.2	2.2 without the lens	1.2
Dimensions	310 x 115 x 156	L310 x W115 x H156	135 x 162 x 112
Warranty	24 months	24 months	24 months
Local service centres available (Asia Pacific Countries Only)	Chubb Fire Australia and Cito Malaysia	Chubb Fire Australia and Cito Malaysia	Chubb Fire Australia and Cito Malaysia
Other features	Most versatile thermal camera available. Best pictures. Video Overlay, Temperature Measurement & Video Transmission options available	X2 Thermal Imager for long range passive covert surveillance operations K2000 Thermal Imager ideal for perimeter and internal security	The smallest lightest, full featured firefighting Thermal Imaging Camera in the world

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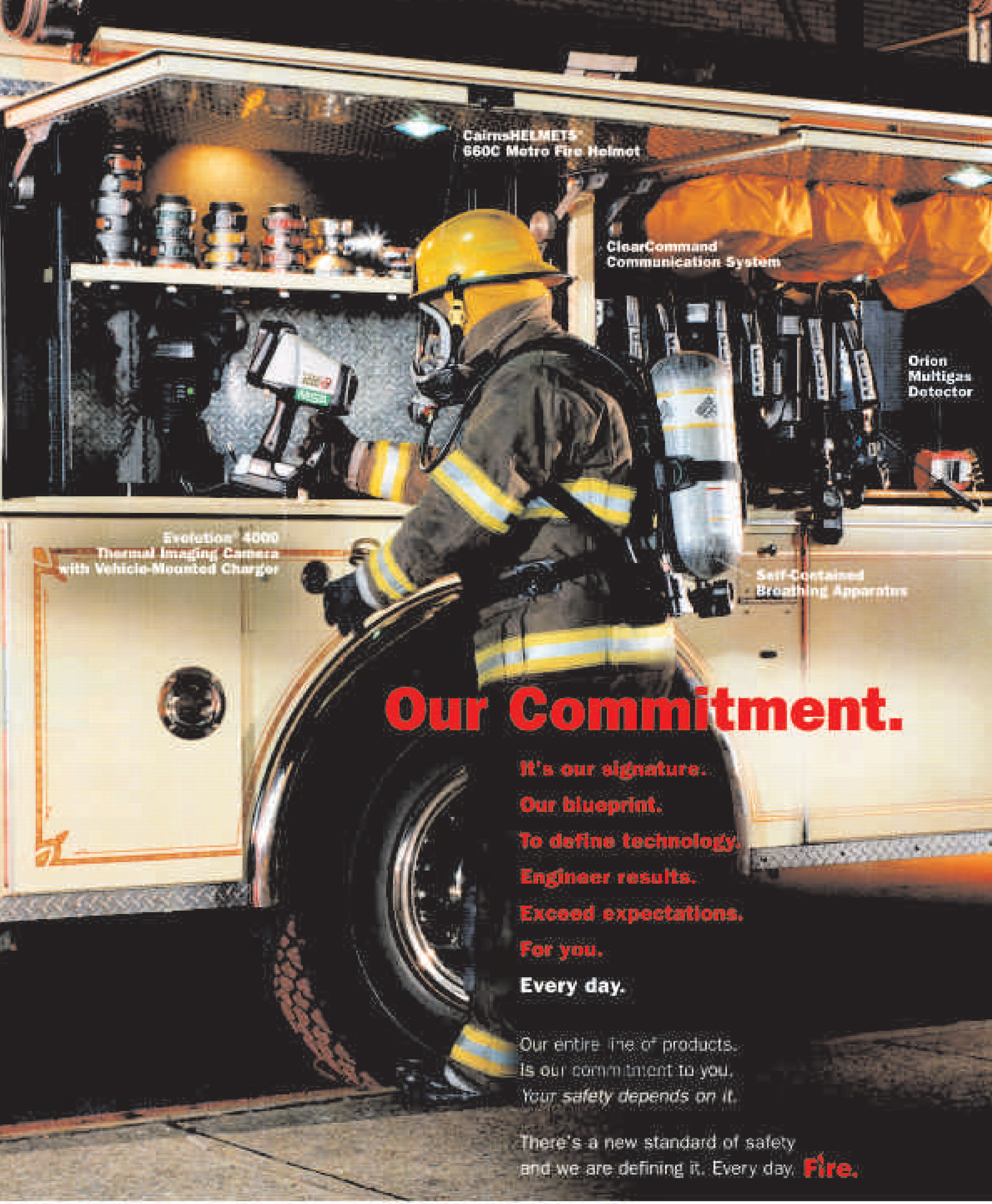

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ISI

Manufacturer	ISI	ISI
Camera Model	ISI Surveyor	Navigator Digital
Origin	USA	USA
Manufacturers pedigree (year of first production TIC)	1998 – Vision 3/2001 – Surveyor	1998 – Vision 3/2001 – Navigator
Detector options	Raytheon BST 300D	Raytheon BST 300D
Battery life	Up to 2.45 hours	Up to 1.45 hours
Ambient temperature measurement available	No	No
Spot temperature available	Yes	Yes
Integral video telemetry available (approved frequency)	External/900MGz & 2.4GHz	Internal/2.4GHz
Weight ready for use (kg)	6 lbs 1 oz with battery	5 lbs 5 oz
Dimensions	7.25H x 6.6W x 13L	6.1H x 6.5W x 10L
Warranty	One year	One year
Local service centres available (Asia Pacific Countries Only)	No	No
Other features	Reverse polarity; Videomix; pistol grip	Reverse polarity; 2x zoom; pistol grip

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MSA

Manufacturer	MINES SAFETY APPLIANCES	MINES SAFETY APPLIANCES	MINES SAFETY APPLIANCES
Camera Model	Evolution 5000	Evolution 4000	Evolution 3000
Origin	USA	USA	USA
Manufacturers pedigree (year of first production TIC)	2002	1999	1999
Detector options	160x120 Microbolometer	320x240 Microbolometer	BST focal plane array sensor technology
Battery life	2 Hours Nominal	1.5 Hours for 1 Battery 3 Hours for 2 Batteries	2 Hours nominal per battery
Ambient temperature measurement available	No	No	No
Spot temperature available	Optional Quick-Temp Indicator	Optional Quick-Temp Indicator	Optional Digital Direct Temperature
Integral video telemetry available (approved frequency)	No – Direct Video Output via SMA Connector	Optional (2458 / 2474 MHz)	Optional (2458 / 2474 MHz)
Weight ready for use (kg)	1.4	2.7	2.6
Dimensions	112mm x 205mm x 275mm	191mm x 215mm x 381mm	255mm x 191mm x 279mm
Warranty	Express Warranty – 1 year from date of sale, not to exceed 18 months from date of manufacture, provided they are used and maintained with MSA's instructions and/or recommendations Extended Service – at customers request Replacement Parts – Warranted for 90 days from date of repair of product or sale, whichever occurs first	Express Warranty – 1 year from date of sale, not to exceed 18 months from date of manufacture, provided they are used and maintained with MSA's instructions and/or recommendations. Lifetime warranty on TIC outer camera housing Extended Service – at customers request Replacement Parts – Warranted for 90 days from date of repair of product or sale, whichever occurs first	Express Warranty – 1 year from date of sale, not to exceed 18 months from date of manufacture, provided they are used and maintained with MSA's instructions and/or recommendations Extended Service – at customers request Replacement Parts – Warranted for 90 days from date of repair of product or sale, whichever occurs first
Local service centres available (Asia Pacific Countries Only)	No – USA Only	No – USA Only	No – USA Only
Other features			

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SCOTT HEALTH & SAFETY

Manufacturer	SCOTT HEALTH & SAFETY	SCOTT HEALTH & SAFETY
Camera Model	Eagle Imager II	Eagle Imager I
Origin	USA	USA
Manufacturers pedigree (year of first production TIC)	2000	1998
Detector options	Micobolometer – Vanadium Oxide	BST
Battery life	2 Hours Non-Transmitting; 1.5 Hours Transmitting (lomger when stand-by mode employed)	3 to 6 Hours depending on use of stand-by mode
Ambient temperature measurement available	N/A	N/A
Spot temperature available	Equipped with radiometric on-screen digital temperature readout	N/A
Integral video telemetry available (approved frequency)	Yes	Yes
Weight ready for use (kg)	2.26	2.6
Dimensions	290mm x 210mm x 149mm	220mm x 158mm x 152mm
Warranty	1 Year (Extended Warranty Available)	1 Year (Extended Warranty Available)
Local service centres available (Asia Pacific Countries Only)	No – USA Only	No – USA Only
Other features	Specifically designed for crawling, the camera also features a unique palette colourisation of surfaces exceeding 450°F (230°C)	Capable of withstanding the most rugged use, the camera features a large, multi-positional LCD for maximum image detail

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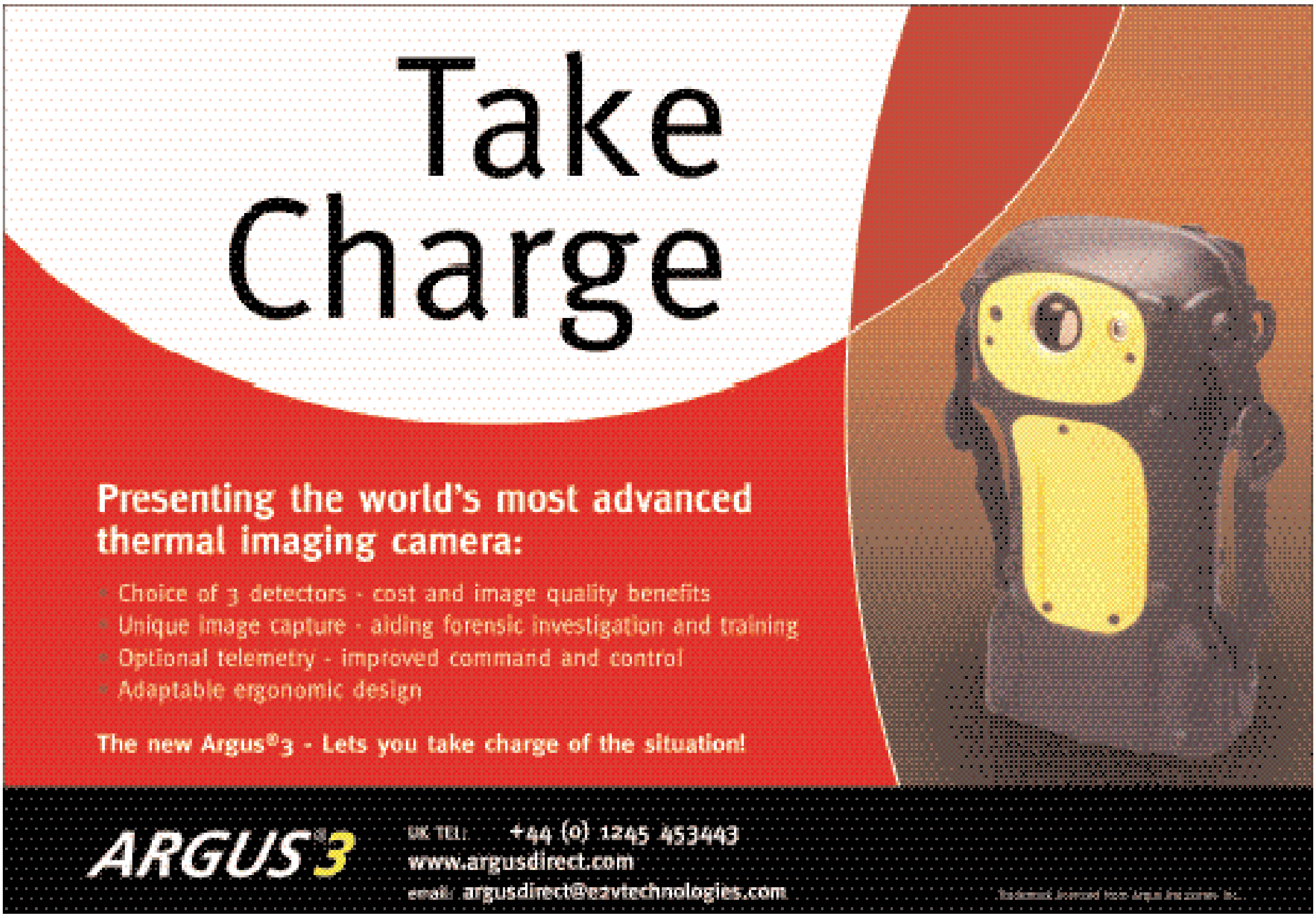

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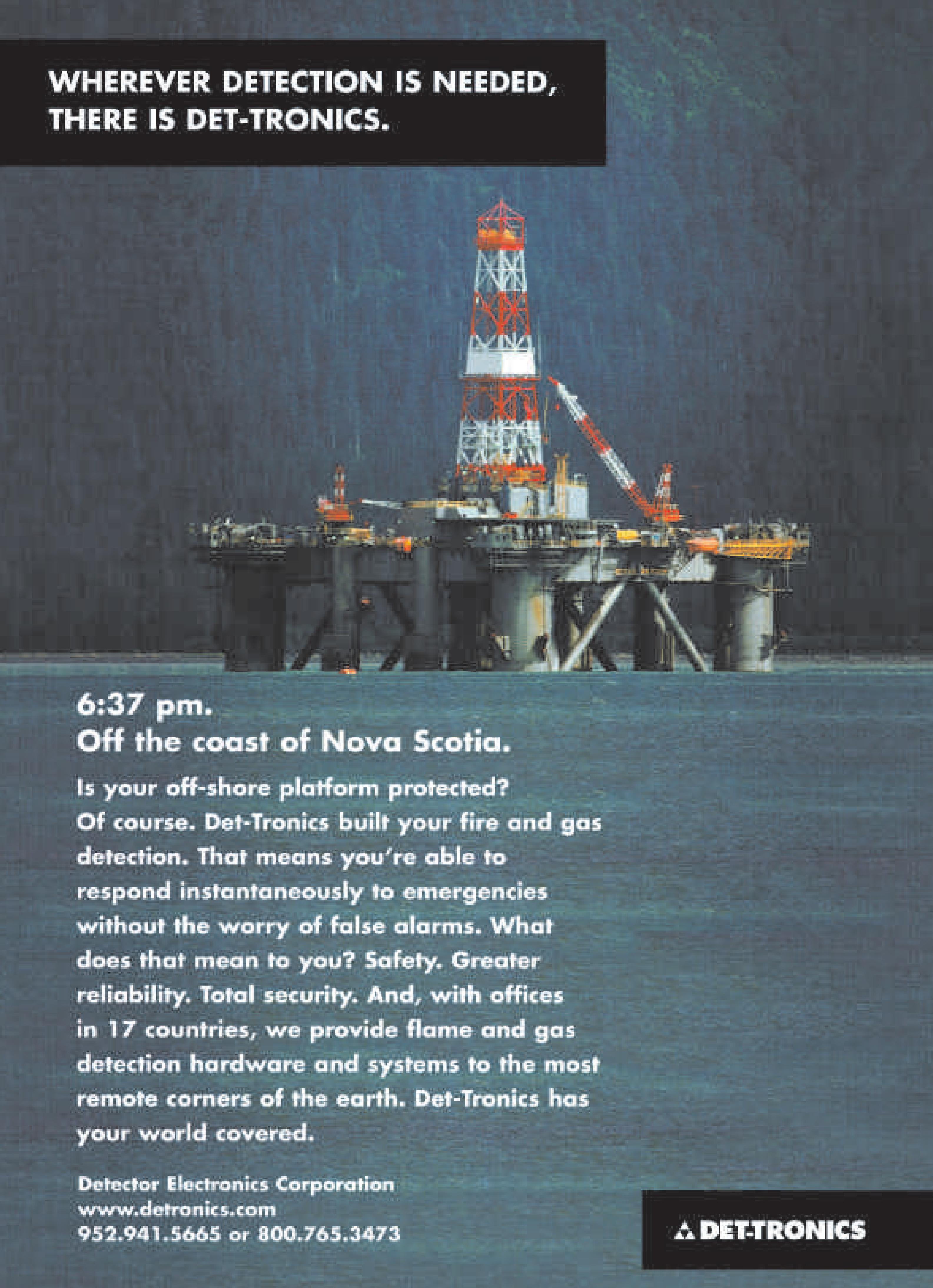

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Fire Detection Systems in Road Tunnels

by Bill Eppich

Shi Huang Tunnel. Picture courtesy of Eternit Asia

FIRE IN A TUNNEL is unquestionably the most feared risk which could happen to a tunnel operator, not only in terms of the potential for catastrophic damage, but in terms of the risk of life. As illogical as it may seem, traveling in a tunnel conjures up in ones mind primal fears about entering an abyss of the unknown. Popular opinion has it that at least 15% of an educated public would avoid using a tunnel if an alternate route would be available. Should a disaster occur, there are very few options for escape compared to a surface disaster. This is why architects of tunnel structures should go to almost inordinate lengths to put safety and prevention of disasters at the forefront of tunnel design. There is a lot of equipment, procedures, attention and resources to look after a few kilometers of roadway which on the surface, does not rate much attention.[1]

During the last decade, tunnel fires in Europe alone have caused 64 deaths and 123 associated injuries. As tunnels continue to handle more than twice the vehicle traffic than originally planned for, the incidents of fire within these structures can be expected to increase. Even more alarming are statistics that show that a higher portion of vehicle fires in tunnels involve HGV's (heavy goods vehicles). An analysis published last year by the Permanent International Association of Road Congress Technical Committee (PIARC), the world advisory body on roads, showed that the rate of truck fires in tunnels was much higher than that of car fires. Before the recent Mount Blanc tunnel fire where 42 people died, there were reported 12.9 truck fires per 100 million vehicle kilometers compared with 1.5 car fires.[2] A recent research study by AIT (Alliance Internationale de Tourisme) in Geneva concluded that 33% of European vehicle tunnels are unsafe and lack adequate safety and fire prevention means.[3] Fire protection in vehicular tunnels must be achieved through a composite of facility design, operating equipment, hardware, software, subsystems and procedures integrated to provide the requirements for the protection of life and property from the results of fire. The level of fire detection and protection required for the entire facility should be accomplished by integrating the requirements developed through proven methodologies whose operating parameters have been tested, applied, and have successfully proven their primary purpose of detection of overheat and fire. Studies of fire protection for tunnels indicate that there are three interdependent factors to be considered. The first is the early detection of overheat or fire and the rapid transmission of alarms to the proper authorities. The second is the response of appropriate fire fighting personnel with minimal delay. The third is a matter of rescue operations followed by extinguishment and control. Where life is endangered by fire, effective rescue operations decreases rapidly with any delay. Unless an effective means of early warning and communication is established, the reporting of fire and other emergencies, coincident with ventilation control, may be of little value in terms of lives saved.

The early warning of heat and fire becomes an important factor in the operation of tunnels. During tunnel emergencies involving fire or the smoke, the products of combustion produces gasses which are potentially toxic or incapacitating. During a fire, the intended purpose of emergency ventilation equipment is to provide control of smoke mitigation and a means to purge smoke and supply a fresh supply of air to the tunnel. It therefore becomes critical to control smoke back layering and heat release rates after the onset of fire so that the ventilation system can become effective. While air velocities in the range of 2.7 m/s must be maintained to prevent back layering of smoke it becomes obvious that the time interval between the start of a fire and the activation of the ventilation system be minimized because hot smoke layers typically will spread rapidly during the initial 2 minutes of a fire. The early detection and warning of fire should be a primary consideration in tunnel design. Unless early fire detection is provided, the most sophisticated ventilation systems or their empirical design data may be overworked as energy release rates and flame doubling times increase. While some experts will argue that a well designed and well operated ventilation system is the key to controlling smoke from tunnel fires, others point out that ventilation systems can fan fires by supplying oxygen to fires, as the recent Mount Blanc disaster illustrated.

Of the available fire and heat detection devices for industrial uses, including smoke detection, optical detection, incident detection, the most promising method of providing the early warning and annunciation of overheat of fire in a tunnel is with linear heat detection technology. Linear heat detectors are reliable, cost effective, impervious to tunnel environments including CO, dirt, dust, EMI, and periodic tunnel washings and are able to monitor long lengths of a tunnel with an infinite number of alarm points along its length. Linear heat detectors are typically used where other types of detectors would be unsuitable which has made their use in tunnel environments more acceptable. Since the introduction of linear heat detection technology over 60 years ago, line heat detection has replaced other means of fire protection for many hazards. Major applications for

Damansara Tunnel. Picture courtesy of Eternit Asia

line heat detectors have included: conveyor systems, cable trays, dust collectors, cooling towers, pipelines, fuel distribution terminals, mines, off shore platforms, tank farms, refrigerated storage, a wide variety of industrial and power plant systems., and more recently, vehicular tunnels. The distinct advantage to linear heat detectors is the ability to place the detector in direct contact with or in close proximity to the area or equipment being protected, or to monitor long lengths of areas in a single detection zone. It is this application flexibility that makes linear detection so desirable where other types of detection technology would not be applicable. Depending on the response time of the detector, many classes of eventual fires may be detected long before the incipient stages of the fire become uncontrolled.

TYPES OF LINE HEAT DETECTORS

There are various types of linear heat detectors currently used in vehicle tunnels around the world. An overview of the various systems available will allow an understanding of the types and why these systems are well suited for this application:

THERMISTOR TYPE

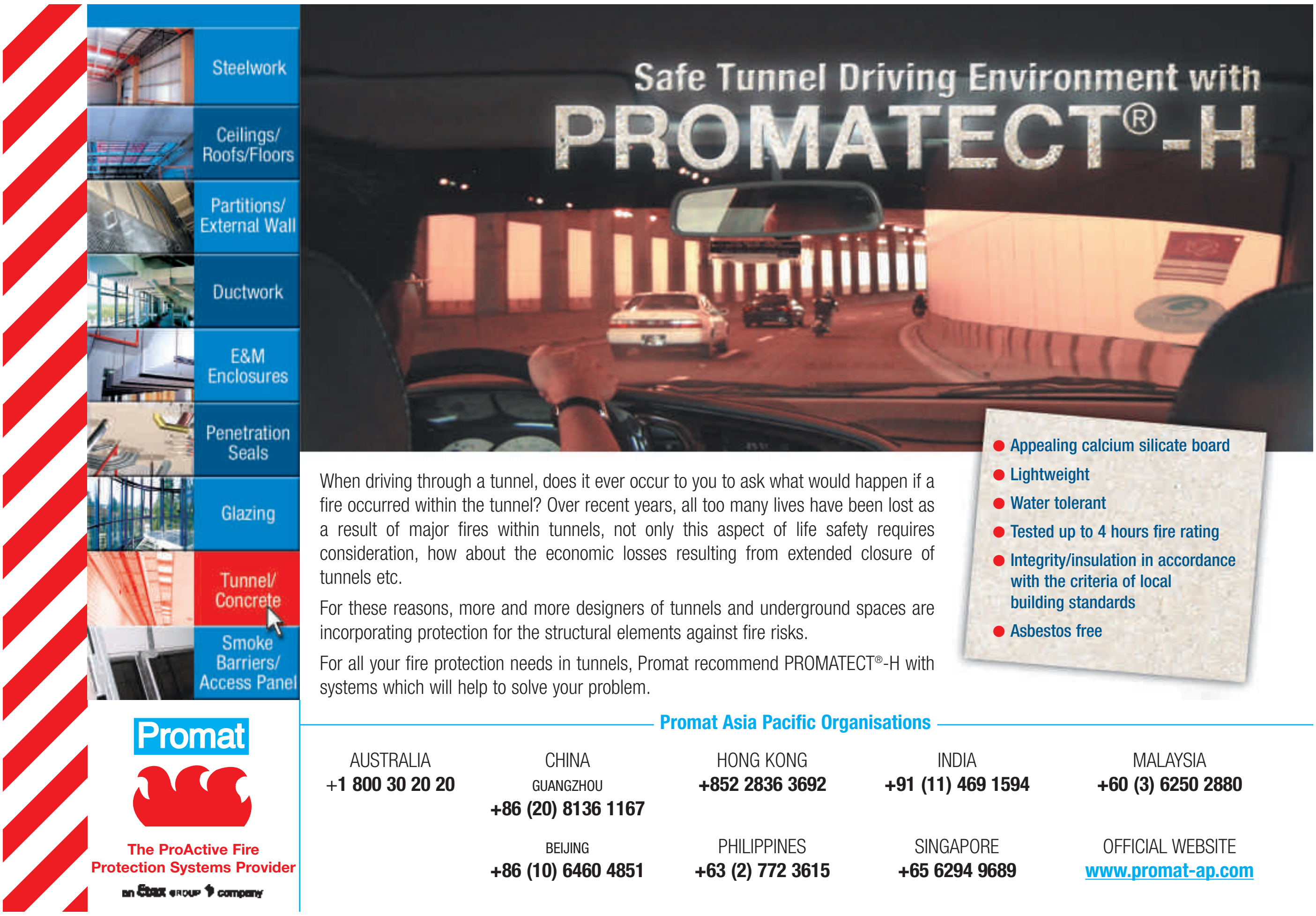
The sensor consists of a center conductor surrounded by a ceramic metal-oxide core and enclosed in a metal sheath. As the ambient temperature increases, electrical impedance between the center conductor and outer shell decreases. The impedance change is measured across the center wire and sheath and is converted to a temperature indication by a control panel. For the system to work properly at least 30 cm of the wire must be heated by a higher than ambient temperature. Even then, it tends to detect high temperatures on short lengths of wire and lesser temperatures over long lengths. Because of its temperature averaging characteristics, an allowance must be made for variations from actual temperature of as much as 30 degrees or 6% of the reported temperature, whichever is greater. The averaging, or integration of the cables characteristics creates slower response times to rapid increases in ambient temperatures.

ANALOG INTEGRATING TYPE

This is a sensor cable consisting of four wires, two of which are coated with a negative temperature coefficient material to measure resistance changes which are converted to an electrical by a special interface module. The other two wires monitor continuity and report a trouble signal if disconnected in any way. The interface module in turn triggers an alarm or trouble condition through a conventional control panel. With this detector the alarm point is the direct result of the length of the detector that must be heated and the ambient temperature of the area. A chart (Nomogram) is provided on which those two points are plotted to determine the temperature at which an alarm will occur, and to select one of twelve alarm trip switch positions (sensitivities) should be programmed to the control panel. Should the maximum ambient temperature change (a strong possibility in some hazards), the switch must be reset, and a new alarm point set as indicated by the Nomogram. The sensor is activated only when the alarm temperature indicated on the chart is present over a major portion of the line length, or a significantly higher temperature is reached at a single location. Since either of these situations requires a considerable fire, the system response time is slower than other types of linear heat detectors.

DIGITAL TYPE

This sensor is made of two spring steel conductors – each coated with a thermoplastic material, which is compounded to



When driving through a tunnel, does it ever occur to you to ask what would happen if a fire occurred within the tunnel? Over recent years, all too many lives have been lost as a result of major fires within tunnels, not only this aspect of life safety requires consideration, how about the economic losses resulting from extended closure of tunnels etc.

For these reasons, more and more designers of tunnels and underground spaces are incorporating protection for the structural elements against fire risks.

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disintegrate at a specific temperature. Upon reaching a predetermined alarm point, the heat sensitive insulation melts and inner conductors create the alarm point. Various alarm temperatures are available to cover a wide range of useable ambient temperature conditions. This sensor is available with a variety of outer insulation's to suit the various environments in which it is used including waterproof, flame retardant and corrosive resistant coatings. Since single zones of this sensor may be as long as 1,070 meters, a display meter is employed in the control panel to indicate the exact location of any alarm. Response Time Index (RTI) of a digital sensor is typically in the order of 38 which accounts for its fast response and accuracy to localized overheat and fire. Digital sensors provide a known alarm point anywhere along its entire length. If the sensor is damaged by accident, or if a fire occurs, all that is required to restore and reactivate the system is to splice a new piece of wire in the line to replace the damaged area. Digital sensors have been in widespread use in industry for over 60 years.

FIBER OPTIC TYPES

Fiber Optic line heat sensors have been introduced within the past few years under various names and operating principles. Most notable is the Optical Time Domain Reflectometry (OTDR) type which operates on a back scattering percentage of light principle along it's length. The sensor constructed of a length of small diameter optical fiber with a light source generated by a laser diode at one end. After the length of cable is initialized along its length to establish the percentage of reflected light based on the Reyleigh theory, the cable establishes a normal, no fire signature. When the cable is heated the fiber optic strand is compressed and micro bending occurs. The amount of compression will be determined by the amount of heat applied and will cause varying degrees of reduced light reflected back to the receiver. Reflected light contains minute levels of light energy according to the theory of Raman Scattering which theoretically would allow the temperature of the heat source to be indicated and reflected back to the control processor. The amount or percentage of reflected light determines the severity of the fire while distance to the overheat may be computed by light velocity versus time formulas. The concern that surrounds fiber optic cables for use in industry or similar aggressive environments is the ability to withstand rough use and handling. While it has been suggested that stainless steel tubing may be used to enclose the optical cable, the transconductance of the steel tubing which acts as a heat sink must be considered as delaying the response times of the detector. The current high cost of microprocessor based control units will initially make the system rather expensive for applications where conventional linear heat detection systems are as suitable. More development will be required for fiber optic line heat detectors before their use can be justified for long term employment in industry with justifiable costs.

FUSIBLE OPTICAL FIBER TYPES

This sensor has an optical strand surrounded by a fusible metal cladding. After initialization from a diode laser to establish normal reflected light patterns, the cable changes characteristics when heated. Any disturbance of the integrity of the core/cladding interface reduces the transmittance of the fiber. Since the detector operates by sensing loss of transmittance caused by fusion of the core due to heat effects at specific temperatures, it is referred to as a fusible optic device. When heated, the cladding surrounding the optical strand melts and allows light to escape thereby reducing the reflected pattern back to the receiver which may be interpreted as a loss of signal or fire. Outer jackets are available to measure extremely high temperatures at long lengths, or moderate temperatures at short lengths. The difficulties inherent with splicing fiber optic cables after an overheat or fire have limited its use unless complete replacement of the loop is made.

INTEGRATED CIRCUIT TYPES

Another type of linear heat sensor uses integrated semiconductor circuits as numerous measuring points, connected by only a single bus cable. Sensor circuits (hybrids) are integrated in certain intervals (e.g. 1.0m, 4.0m, 16.0m) within a robust cable or small diameter aluminum tube. Each sensor consists of an addressable integrated circuit and a semiconductor temperature measuring element. Up

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Picture courtesy of The Protectowire Company, Inc.

to 1024 measuring points could be configured, each with an individual address. Essentially, the detector is a series of spot detectors connected in a continuous length. The transmission of data is done in analog form as the sensors provide an impressed current of about 200-400 m-Amps which is proportional to the temperature. Current is measured by a control unit and converted by software to temperature values, while control algorithms supply sensors with power, addresses, temperature calculations, and value comparisons to determine various temperature profiles. Individual sensors may be preset to report temperature differences anywhere along its length.

PNEUMATIC TYPE

Pneumatic type heat sensors operate on the principle of gas expansion in a small sealed copper tube that is connected to a diaphragm monitoring device and capillary tubes. The pressure in the sensor tube rises and creates a pressure differential at the capillary tube if in case the fire there is a sudden rise in temperature in the monitored area. This pressure difference is checked by a diaphragm releasing the alarm via an electric contact when the alarm limit is reached. In view of conditions encountered with aggressive environments, ambient heat, atmospheric conditions, frequent diaphragm replacement, and regular maintenance, the detector is generally limited to zone lengths up to 80 meters, with a diaphragm monitor required for each zone. These systems may be generally found in Europe but have seen limited use outside the EU.

CONCLUSIONS

The recent trend for tunnel designers have placed emphasis on the integration of various subsystems within the tunnel into a common computer controlled system and user interface. In addition to plant monitoring, environmental control, communications, traffic control, and emergency operations, fire detection has become an important consideration in tunnel design. Recent tunnel fire tests in Italy and Norway have concluded successful results with integrated safety systems where CO, NO, temperature air velocity, opacity monitoring and linear heat detection technology may be combined into a single subsystem for input to a SCADA system. The latest edition of NFPA 502, Standard for Road Tunnels, Bridges and Other Limited Access Highways, requires at least two systems to detect, identify, or locate a fire in a tunnel, including one manual means.[4] Automatic fire alarm systems become an integral part of these subsystems to extend the life safety requirements of the tunnel by providing an early warning and location of fires. While fire detection systems for use in tunnels in the past have been considered as a "compliance trade" or "necessary evil", that is, unless required or mandated, they have been overlooked primarily due to a lack of understanding of their operating parameters. The fire science community is striving to educate tunnel designers and end-users around the world as to the benefits of these systems being part of their integrated subsystems. As new technologies in fire detection continually emerge, these systems will enhance safety for both the normal operational environment and emergency situations with particular emphasis on fire safety.

ACKNOWLEDGEMENTS

1. Howe, Peter, Cegelec Australia – 2nd International Tunnel Conference, Amsterdam, March 1997
2. Reference www.newscientist.com, Archive 19 – June 1999
3. Reference www.aitgva.ch
4. National Fire Protection Association, NFPA 502, Standard for Road Tunnels, Bridges, and Other Limited Access Highways.

Bill Eppich is Manager of Special Hazards Engineering for the Protectowire Company Inc. in Boston. He serves on the Technical Committees for NFPA 513- Motor Freight Terminals, NFPA 520- Subterranean Spaces, and is Secretary of NFPA 502- Standard for Road Tunnels, Bridges, and Other Limited Access Highways.

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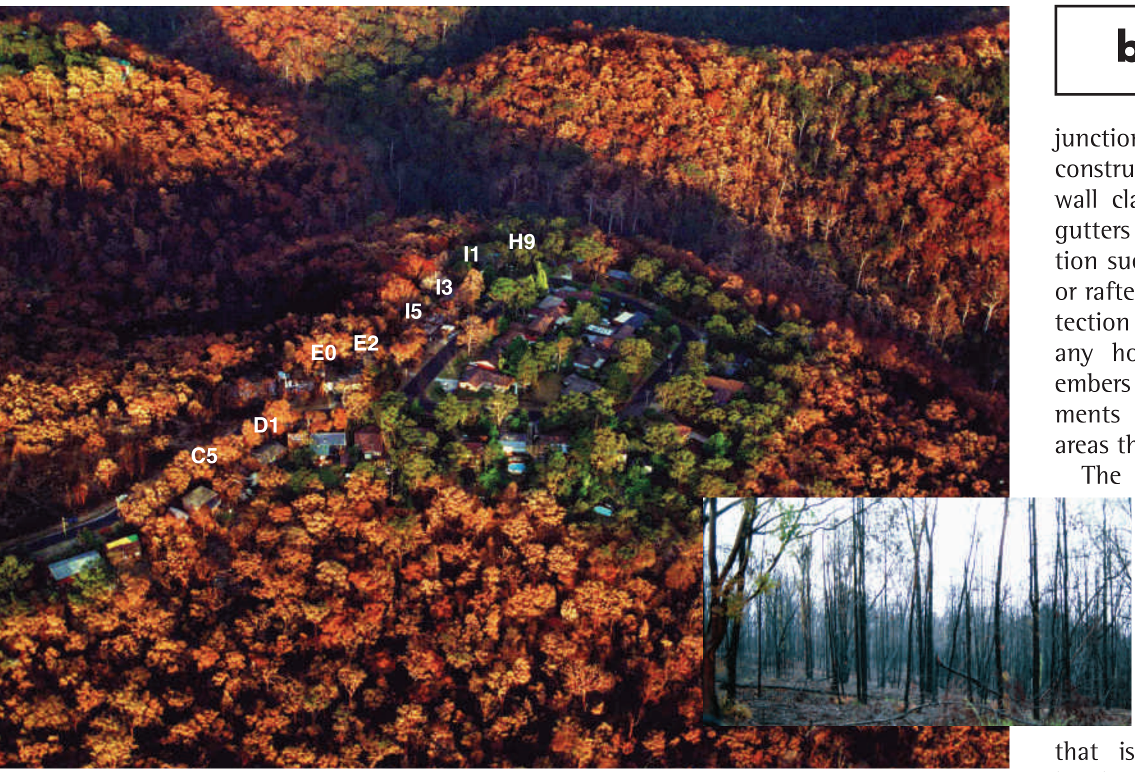
Building Considerations in Wildland Fire Prone Areas

by Leong Poon



An aerial view of a wildland fire affected region. Note the extent of fire spread halted by separation provided by roads and vegetation clearance around the houses. Six of the houses (D1, E0, E2, I1, I3 and I5) along Cross St in the direct path of the fire were completely destroyed. (Inset shows burnt vegetation)

Surveys that have been conducted on houses following the aftermath of wildland fires have identified three modes in which houses may be attacked.

(a) **Burning debris lodging on combustible material**
(b) **Radiant heat from the fire front**
(c) **Direct flame impingement.**

Burning debris or embers (also called brands or firebrands) are fragments of combustible materials, which are lofted upwards through the fire plume and propagated by the prevailing winds. Due to their extensive means of transport from the fire source, burning debris can attack buildings some time before and for many hours after the fire front passed, and is considered the major source of ignition of buildings during a wildland fire. Buildings that survive the fire front have been known to subsequently burn down some hours after due to fire initiated by burning debris.

High radiation levels from the flame front usually last only several minutes as it passes the building. Ignition of combustibles that occur via exposure to the imposed radiant heat is considered as 'spontaneous' or unpiloted ignition. In addition to the flame front, significant combustibles adjacent to the building may also become a fire source. These include adjacent buildings and external structures such as decks and sheds.

Combustibles located close to the building may be ignited by burning debris or from the imposed radiation from the flame front. If the combustible is sufficiently close to the building, direct flame contact with the building may occur. However, there is little evidence of actual direct flame contact to be found in the surveys that were conducted.

Resisting ember attacks

Embers cause ignition by being in contact with combustible materials. The areas where this can occur include window and door sills, timber decking or in junctions next to vertical combustible construction such as stumps, post and wall cladding. Embers accumulated in gutters may ignite adjoining construction such as roof battens, fascia boards or rafters. Vertical elements require protection against embers near the base of any horizontal projections on which embers can accumulate. Horizontal elements will require protection over all areas that can contain embers.

The second means of ignition by embers is through the breaking of glazed windows. A simple means of protection from this form of ember attack is by the use of metal mesh or external shutters. The mesh should be able to filter out the smallest projectile size that is capable of causing window breakage. However, it should also be sufficiently fine to not allow debris to accumulate and develop a hot spot that may cause localised failure of the glazing. Internal mesh screens can also provide a level of protection if a window breaks if they remain in place.

The use of metal mesh, however, may significantly affect the amenity of occupants and glass, with a reasonable resistance to the impact of debris, may be a more acceptable solution.

Resisting radiant heat

Windows and other openings are the most likely means through which radiation can penetrate and ignite combustibles in the building. Window glazing possesses some radiation blockage but are vulnerable to breakage under the imposed heat. The following are potential means to reduce the likelihood of window breakage against radiation but further work is required to quantify the performance of these elements:

- Double glazing
- Toughened glass
- Laminated glass
- Fire resistant glass
- Window shutters

The gutted building had 5mm steel mesh over its windows. It is likely that the mesh would have prevented burning brands from gaining access through the windows. It is therefore suspected that access was gained through the crevices in the roof.

The systems would also be expected to have improved resistance against window breakage from debris/ember attack.

Resisting flame impingement

The effects of severe fire exposure including flame impingement are difficult to quantify. Based on studies carried out at Warrington Fire Research (Australia), a 30-minute fire resistance level has been recommended for construction materials to withstand the flame front from high intensity forest fires. AS 1530.4 is presently being revised to include options to expose elements to radiant heat flux.

Holistic approach to wildland fire safety

Site Assessment

The occurrence of wildland fires in areas where it has the greatest propensity to threaten buildings and its occupants is in the interface area where the urban construction borders with wildland vegetation. The extent of protection required depends upon a number of factors but mainly on the amount and type of vegetation and the proximity to the vegetation. A secondary issue is the proximity of adjacent buildings or construction that when alight may pose a greater threat than the effects of a wildland fire. In urban dwellings, an adjacent building may only be 1.8m or less away.

The outdoor furniture consisting of a bench and a table at the rear of a destroyed house were left essentially intact.

Site Planning

An important consideration when building in wildland fire prone areas is choosing a location where the hazards from the effects of a wildland fire is minimized. Considerations relating to site planning in a wildland fire prone area include the following:

- The separation distance between the building and the vegetation.
- Construction that may become potential ignition sources.
- Slope of the land (avoid top of slopes).
- Prevailing winds (avoid leeward side of vegetation).
- Access to building (more than one path for occupant access, adequate widths for fire-fighting appliances).

Fuel Management

Fuel management essentially involves the control of vegetation such that there is an area of 'defensible space' (see NFPA 299). The extent of fuel reduction required will depend upon the site conditions. In general, measures should include treating ground fuel (eg mulching), clearing dead vegetation, pruning live vegetation and reducing height of intermediate vegetation or ladder fuels as part of a fuel management strategy.

Site Maintenance

Maintenance of the site is important to ensure that the strategies that have been identified and implemented in providing a measured level of defence against wildland fire attacks will be available when the need arises.

Evacuation

The issue of evacuation is not straightforward and the decision to stay with the house or evacuate is not readily resolved. There are three broad categories of actions:

(a) Evacuate early
(b) Evacuate late
(c) Do not evacuate

The decision to evacuate does not necessarily mean that the risk to wildland fire attacks is reduced. Late evacuations can lead to congestion in the roads and possibly entrapment by the effects of wildland fires. Occupants should acquire sufficient information in order to be well informed in deciding on an appropriate escape route. The choice to evacuate should be based upon giving priority of saving lives over property. Only if occupants believe that adequate means have been put in place to ensure survival through the wildland fire attack should the decision be made to stay.

Houses adjacent to the destroyed house with light trimmings still intact. Many of the houses that were destroyed have adjacent houses that were left virtually intact. In other words, the houses were either completely destroyed or suffered minor damage. Where houses were completely destroyed, firefighting activities were either not available or not successful.

Fire Fighting

Reliance on fire fighting is usually placed upon country-based fire-fighting services. However, providing a water supply for occupant fire fighting purposes can enhance the chances of surviving the wildland fire. In particular, connecting to hand-held hoses is useful to:

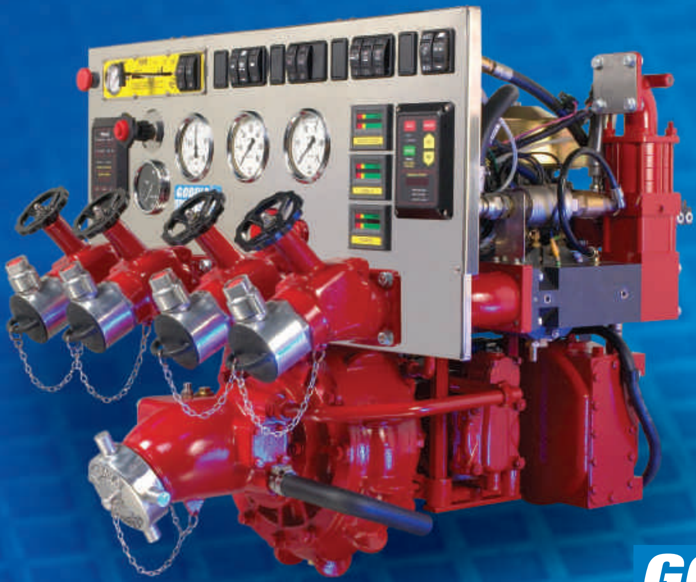
(a) wetting the surface of combustible materials (walls, roofs, decks) to reduce the risk of ignition, and
(b) extinguish spot fires before, during and after the passage of the fire front.

Observations from wildland fire investigations

The observations made in a recent wildland fire substantiates the findings that ignition of houses that were destroyed were likely to be from burning brands (gaining access either from crevices or through broken glazing).

Leong Poon Ph.D is the Research Manager of Warrington Fire Research (Australia). His areas of interest include fire development, occupant behaviour and structural behaviour.

The innovations continue...



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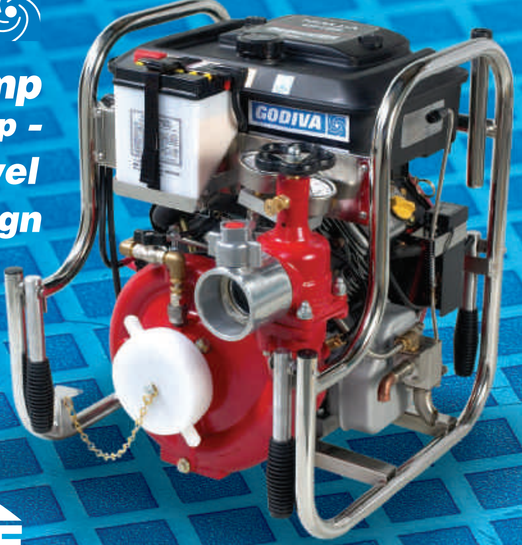

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Compressed Air Foam Systems

by Dominic J. Colletti

Picture courtesy of Hale Products, Inc.

AS DIFFICULT AS IT IS to observe grass grow, it is likewise difficult to spot emerging trends in the fire service. One emerging trend is the use of Class A foam and Compressed Air Foam Systems (CAFS) to fight all sorts of ordinary combustible materials including structural fires.

If you have not investigated the potential impact of CAFS on your fire operations and firefighter safety, the level of service provided to the community could be cut short. That is due to the fact that Class A foam and CAFS are current technologies that have shown significant capability to reduce fire loss and increase firefighter safety during manual fire combat.

While structure fires of all types are likely to cause the largest dollar loss in your community, residential dwellings – the "bread and butter" of fire operations – statistically remain the leading firefighter fatality and injury hazard in the United States. Using Class A foam and CAFS correctly can assist in the reduction of firefighter injuries by reducing fireground exposure to the hostile fire environment of heat and toxic products of combustion.

Here are the results of one written survey of brigades that currently use Class A Foam and CAFS in fire operations:

. . . Please list and briefly explain the positive effects you have found of using Class A foam and CAFS in fire operations.

- *Quicker knockdown of structure fires.*
- *Quicker reduction of heat – cooler environment.*
- *Much greater knockdown of fire, ideal for exposure protection.*
- *Less overhaul mop-up.*
- *[Gives us] confidence in leaving the scene.*
- *Less exposure for firefighters to hazards of firefighting.*
- *Excellent exposure protection – long and short term.*
- *Reduction in firefighter fatigue due to reduced suppression time and effort.*
- *Less water needed . . .*

Picture courtesy of Hale Products, Inc.

Compressed Air Foam Systems

To summarize field experiences of using Class A foam and CAFS in fire suppression, we find that flaming combustion is stopped quickly, overhaul times are reduced and exposure protection applications become more efficient. Since the fire threat is stopped in less time, firefighter stress and property damage are reduced. With less total water supply being used to extiguish a structure fire, damage to building contents away from the immediate fire area is lessened.

Picture courtesy of Hale Products, Inc.

What is Class A foam and how does it work? Class A foam concentrate, purchased from the manufacturer in either five or 55-gallon containers, is made to be diluted with water and applied on ordinary combustible fuels. Originally used in forestry firefighting, it was developed in Canada during the early 1980s. After its introduction, forestry firefighters found exposure protection applications for the product on homes situated in the wildland/urban interface. Trial and error testing by fire instructors also indicated that it worked well for direct fire attack on other common materials (besides foliage) including those encountered in structure firefighting. This includes deep seated hay bales, coal silos and automobile tires.

Class A foam concentrate is classified as a synthetic detergent hydrocarbon surfactant and is *similar* to a triple strength dish detergent. Its components reduce water's high surface tension to effectively make water penetrate the crevices found on fuel surfaces. Additionally, it contains foaming agents that create bubbles when the foam solution is agitated with air. The bubbles created keep the water contained within them in contact with vertical surfaces to provide efficient fuel cooling. Class A foam clings to fuels instead of rolling off, preventing the fireground water waste associated with conventional water fire streams.

Picture courtesy of Hale Europe

In structure firefighting applications, Class A foam works well when applied on burning synthetic fuels associated with interior furnishings and finishes (such as foam chair padding). These synthetic fuels are hydrocarbon based and give off much higher rates of heat release and burn at higher temperatures than their non-synthetic counterparts. As they undergo pyrolysis, flammable gases distilling from these synthetic materials increase flashover potential for firefighters inside a compartment involved in rescue or suppression activities. The benefit for initial attack teams is that Class A foam provides the extra punch needed to knockdown and secure high-challenge synthetic burning materials.

What is stopping your brigade from taking the required steps to invest in Class A foam and CAFS? Do decision-makers perceive Class A foam concentrate to be expensive and difficult to mix and apply? Do they think that it is similar to Class B (flammable liquid) foam? Do they believe that CAFS equipment is too costly and is not needed? What may seem intuitively true in theory is not always so in practice.

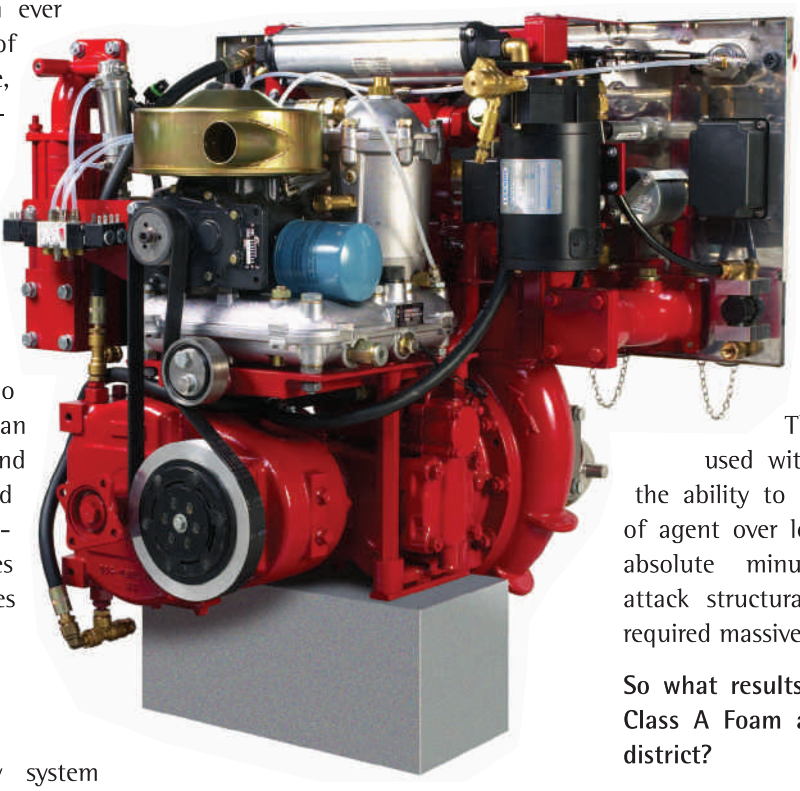
Today, new technology built into foam proportioning hardware has made Class A foam application easy, accurate and more cost-effective than ever before. The initial investment of acquiring foam concentrate, foam hardware and department training must be weighed against the benefits they provide. That's right, foam equipment is an *investment*. When costs such as Class A foam concentrate and CAFS hardware can be proven to turn a yield, they are no longer an expense, but rather an investment. Class A foam and CAFS technology makes good economic sense for your community because it reduces property damage and increases firefighter safety.

COMPRESSED AIR FOAM SYSTEMS

The most effective delivery system available today to generate Class A foam is a CAFS.

Simply, a pumper equipped with a CAFS contains a high-volume air compressor (50- to 200-cubic feet per minute in size) integrated with a foam proportioning system and the normal centrifugal fire pump.

In a CAFS, compressed air is injected into foam solution in the apparatus piping, prior to discharge into the hoseline. Finished foam is discharged into the fire hose or fixed master stream appliance. The features of using CAFS, over using standard branches and foam nozzles to generate finished-foam, include higher quality finished-foam production, lightweight hose lines, increased fire stream discharge distance and finished-foam consitencies that range from “milky” wet to “shaving cream” dry. The benefits for the fire officer are increased flame knockdown capability from a limited water supply, better exposure protection, less fatigue from lightweight CAFS hoses (hoselines are filled with a partial volume of air) and increased foam stream penetration into burning structures to reach the core of the fire.



Picture courtesy of Hale Products, Inc.

Picture courtesy of Hale Europe

The potential of CAFS used with Class A foam offers the ability to deliver large quantities of agent over long distances with the absolute minumum manpower to attack structural fires that previously required massive tactical operations.

So what results can you expect from Class A Foam and CAFS in your fire district?

Initial attack time should be reduced on most fires. For those fires which are not knocked down with the initial attack, susutained combat time should be reduced. Overhaul and mop-up times for all fires should be reduced.

Implementing CAFS can significantly improve your fire suppression capability. If you are considering a new fire engine, and plan on keeping it in service for some time (10 to 20-years), it makes sense to install the best technology currently available and implement a brigade-wide training and education program. If a fire engine is delivered today without a CAFS installed, it is technologically obsolete.

Dominic J. Colletti is the director of sales at Hale Products Inc. and is an author and fire instructor. For over a 15 years, Dominic has focused his efforts in researching the best Class A foam and CAFS application techniques. Dominic has authored *Class A Foam—Best Practice For Structure Firefighters*, a book that contains real-world data from brigades using Class A foam and CAFS in firefighting operations. The book is available through the author.

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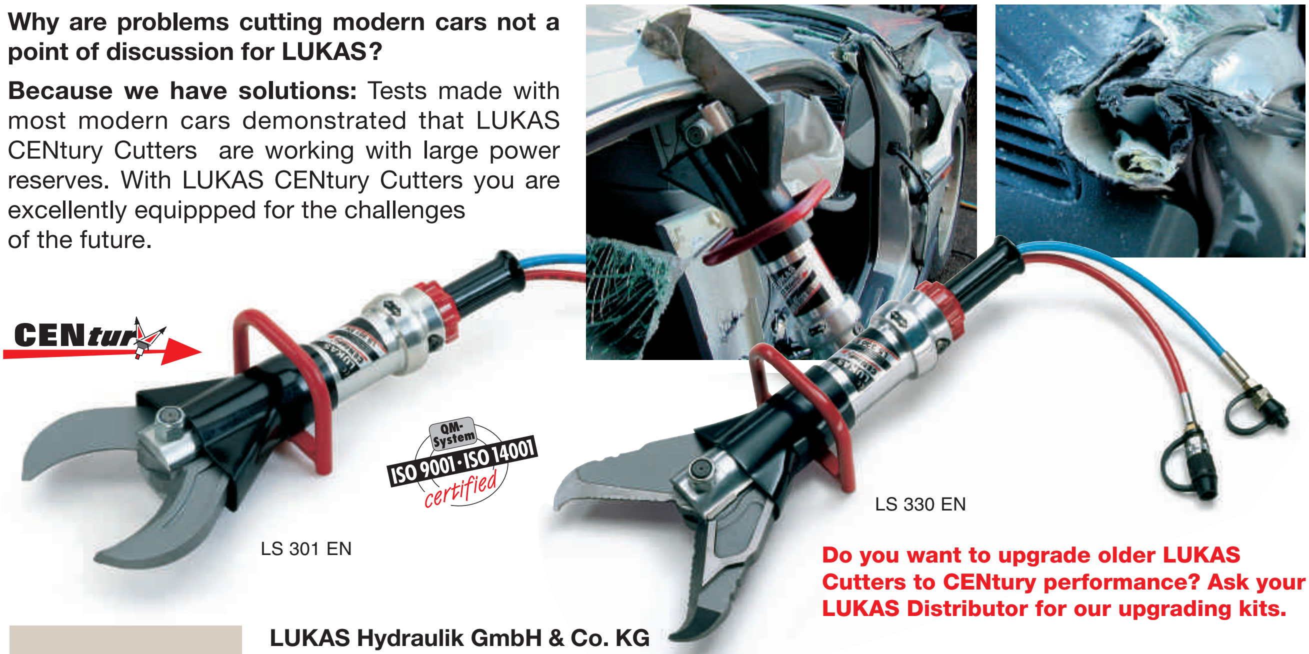

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by Dennis Beck

The use of heavy-duty lifting and stabilization equipment on lorries and specialized cutting gear for extrication

Picture courtesy of Zumro b.v.

THE PROPER USE OF RESCUE LIFTING BAGS is essential for saving lives at accidents. Not only at road accidents, when using bags to stabilize vehicles but also when buildings have collapsed due to earthquakes when the bags can be inserted in hard-to-reach places in order to save lives or free corpses from the rubble. In order to achieve the lifting height you desire, it is necessary to create a stable column of bags to gain lifting height.

The use of lifting bags is a topic, which needs more explanation. There are several kinds of lifting bags in use today and they all have their own advantages or specific usage techniques. Certain characteristics however must be applied to each lifting bag. So let's have a look at each of the lifting bag types and their specific usage.

1. Low-pressure bags ½ or 1-bar types, cylindrical or square type shapes.
2. Mattress types with fibers between top and bottom for stability.
3. 8 bar high-pressure pillow type.
4. New Technology 10 bar spherical shape connectable type.

These are the known types of lifting bags. Let us go through the specific use of each type of bag.

1 LOW PRESSURE BAGS

½ or 1 bar cylinder type or square bags

In general low-pressure bags are mainly used for recovery. Why? Let's first look at their construction. The sidewall is a reinforced (mostly by nylon fiber) rubber mat, which is glued together like a cylinder. Then the top and the bottom rubber mats are glued to the cylinder and there are belts between the top and the bottom. The belt functions are to give stability when fully erected.

The square types are basically of the same construction, but claim more stability through their square bottom mat. Both can have an extra-glued mat on top or bottom to give a good resistance against puncturing. Both types are relatively stable when fully inflated and at maximum inflation height.

As said they are mainly bought for recovery. Why? As there maximum pressure is only ½ bar. This means ½ kg/cm^2. They can lift a bus or lorry with very weak sidewall construction without damage, by spreading the lifting load over a wide area. These vehicles usually have big surfaces so enough force can be generated to lift the vehicle in order to put it back on its wheels. In order to put a vehicle back on its wheels you have to move it through an arc.

This is possible as the bags are very flimsy and they can follow the arc until they reach their maximum lift.

There are 2 important factors to realize:

(a) You are using a pressure of a ½ bar (½ kg/cm^2). In order to reach 6 tons lift capacity you therefore need an area of 12000 cm^2 that is approx. 110x110 cm or a diameter of 124 cm.

(b) The bags provide no stability until they reach their full inflation.

From the above you can conclude already that you cannot use these bags to lift a heavy load in a small area. If only a small contact area is available you cannot lift. This is why you need a high-pressure bag or a hydraulic cylinder. More on this issue later!

2 MATTRESS TYPES WITH FIBERS ETC.

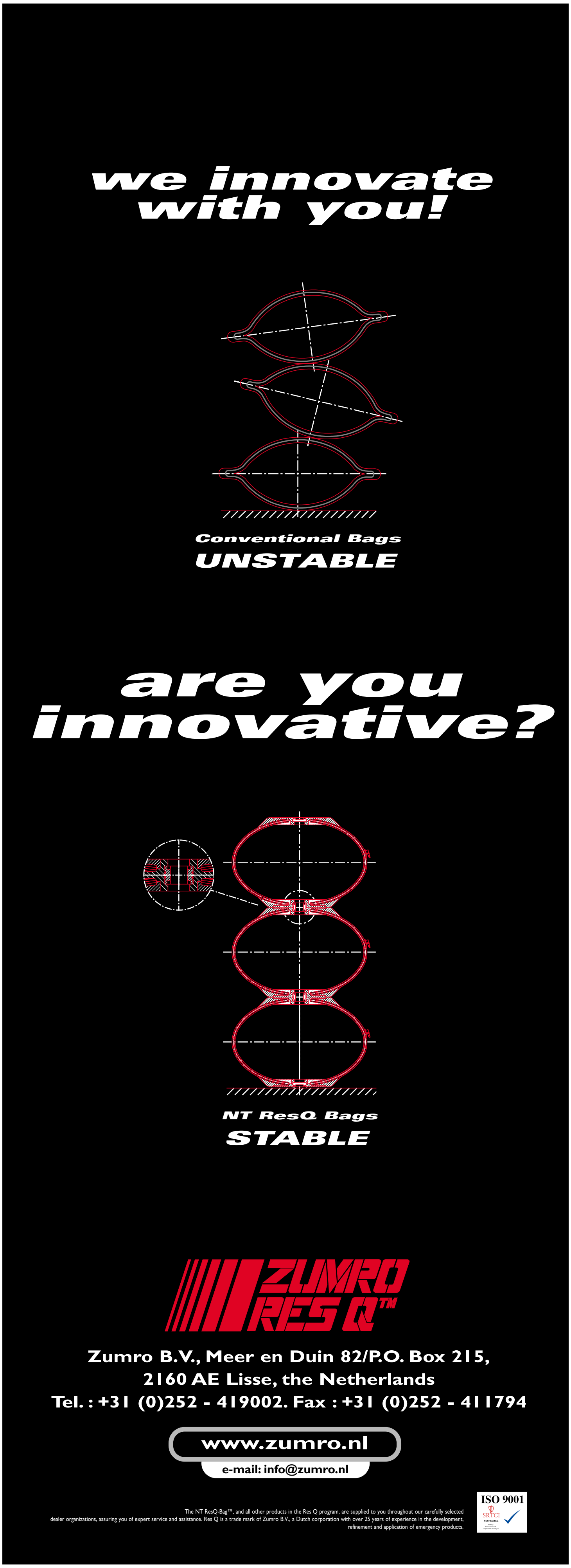
The fibers between the top and bottom are there to provide more stability.

This again is only achieved when fully inflated. You then inflate mattress by mattress in order to reach the required height. Of course the mattresses are glued together which means they are heavy and relatively expensive and therefore only used in aircraft recovery. Again you need a big surface area in order to reach the required lifting force.

3 CONVENTIONAL 8 BAR BAGS

8kg/cm^2 pillow types

First let us look at the construction of these bags. You take a square or right-angled piece of material that does not glue together under pressure or heat.



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Then you take strips or a mat of rubber and cover the first material on both sides. Then a mat of woven fibers or steel wire is folded over this rubber mat. This will be covered with rubber. You then put an inlet in. Then you put it in a mould and vulcanize it under pressure.

The industry typically looks for a 25 ton or 50 ton bag. Many people think that they can lift 25 tons with a 25 tons bag, which is a complete misunderstanding. With a 25 tons bag you only can lift a much smaller load. Why? It is important to realize that if you have a flat mat and you inflate it, the shape changes as you go from a flat mat to a round pillow shape.

Of course the round shape can only be obtained in the middle. As soon as you start to inflate the bag the corners cannot follow the deformation. What does this mean? The result is that the working surface will rapidly become smaller until you only have a very small spot left over. This means no force remains.

If you have a 25 tons bag and you lift 5 tons you can only lift 22 cm. If you need to lift this further, you need a much bigger bag or 2 of the same type on top of each other. This is where the problem starts. If you put two pillows on top of each other they are not going to be very stable. There is one other factor. Almost every load that you lift describes an arc. For example, think of lifting a concrete plate.

As you lift the plate, the two pillows will start to rotate and they are no longer in the center of each other. Finally they will pop out.

Another example is lifting a heavy load with a small lifting area, for instance, the differential of a lorry.

You first need to create a platform under the axle in order to increase the lifting area. In between you place the lifting bag, or if you dare 2 bags. Then you inflate the bag(s). You still have a very limited lifting height (depending on the size of your bag(s)) and a very instable lifting device. Of course any lift needs to be cribbed or stabilized. But more on this issue later. Because of the above-described operational hazards, these bags are only used as a last resource by most fire brigades. Therefore they are not popular with most firefighters.

4 NEW TECHNOLOGY 10 BAR CONNECTABLE TYPES

These newly developed bags were initiated as a pneumatic lifting system that could incorporate the advantages of both low and high pressure lifting bags in one system. How has this been accomplished? First of all, the manufacturer wanted to have a stable flat surface. Secondly, the shape should be circular so that there is no loss of surface area. Thirdly, the bags should be connectable, to each other in order to create a column, and to other items of equipment.

These requirements were achieved by making the bags spherical in shape with integral metal plates on top and bottom, fitted with threaded connectors.

Picture courtesy of Zumro b.v.

And so a whole new concept of lifting bags was created.

As you can see the New Technology bags can lift heavy loads with a small area, by connecting a point load plate. The point load plate is a solid steel plate that can be connected to the integral metal plate of the bag.

They can achieve almost any lifting height by connecting several lifting bags together, forming a stable column.

As they have a given minimum area on top (a metal plate) they always have a remaining minimum force, which also gives them a stable footprint to provide stability (no chance for rotation). They can be used as recovery bags by only inflating the top one to ½ bar and lifting with the remaining bags.

For any specific situation, you need a much smaller number of bags, and there is no need for oversized bags, as the NT bags are connectable. They are available in three sizes: 23, 58 and 132 tons.

CRIBBING AND STABILIZATION

As every rescuer knows, every lifted load should be cribbed and stabilized. This is a basic safety rule.

What is available on the market? In former days rescuers used wood for cribbing. But this is bulky, heavy and troublesome. Now most rescuers work with recycled plastic cribbing material (polyethylene). This is lighter; it does not absorb water or chemicals and has no splinters. The function remains the same. Most important with cribbing materials is the ability to stabilize the load through almost every centimeter of vertical movement.

For stabilization with higher or greater distance, you need stabilization jacks. These can be anchored into the ground or at the bottom and the top. When fastening to any object in order vehicles, pieces of concrete, trains etc can be stabilized. The stabilization jacks are made of three telescopic sections, which can slide inside each other and can be fixed every 5 cm. This enables the rescuer to work steadily and easily to free victims.

SPECIALIZED CUTTING GEAR FOR EXTRICATION

In confined spaces rescues you often need a small cutter to free the victim. This type of cutter should be capable of imitating your wrist by means of articulation. Then it can be used in places a bigger cutter cannot reach. Such an articulated cutter should also have the capability to cut without impact, because you need to cut at close distance of the victim. Impact-free means that when you cut a piece of material the free pieces will not shoot away with great force.

> During the past 10 years, Dennis has gained extensive international experiences in the field of rescue equipment due to the many courses he gives to firefighters. He therefore became a specialist in the utilization of this special type of equipment and their appropriate techniques.

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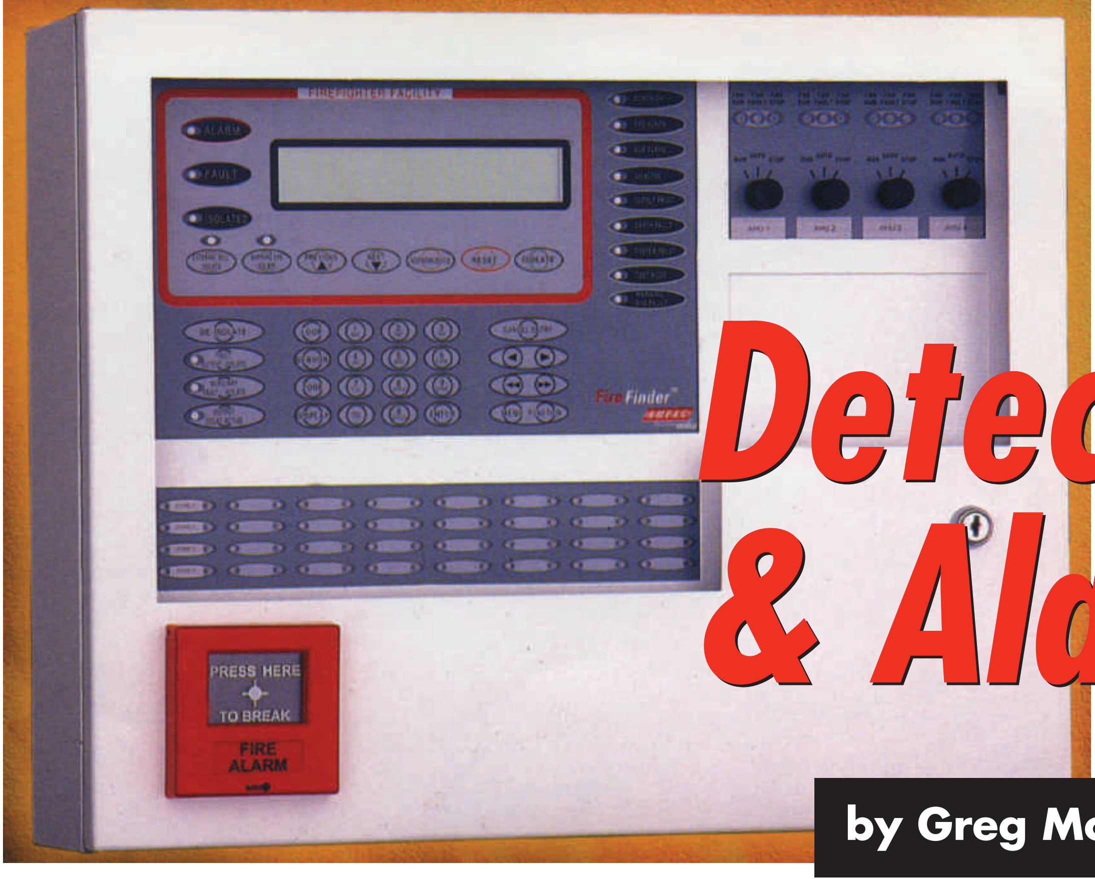
Fire Detection & Alarms

by Greg McCulloch



Picture courtesy of Ampac Technologies PTY. Ltd.

THE FIRE DETECTION INDUSTRY has a fundamental problem; we don't actually produce a detector that can directly detect a fire. The best we do is detect the symptoms of fire – heat, smoke, radiation and gas. There are many sources, other than fire, that can activate a detector. Generally a human assessment is required to determine if the source of activation is a fire. A standard automatic system will notify the Fire Brigade before an assessment can take place.

This predicament leads to a large number of 'unwanted alarms'. An unwanted alarm is defined as an alarm generated by an incident that has produced enough smoke or heat or similar to activate the fire detector but does not pose a threat to occupants. Some common examples include burning toast, cigarette smoke, and shower steam. Unwanted alarms consume Fire Brigade resources, result in down time and lost revenue for the building occupants, create occupant indifference to real alarms, cause unnecessary stress, and tarnish the reputation of the Fire Detection industry.

Unwanted alarms can be caused by:

Incorrect detector selection – the sensing element of the detector selected does not match the risk. For example, a smoke detector will be activated by the normal activities within a kitchen.

Detector location – the correct type of detector is selected, however, it may be installed too close to a potential source of unwanted alarms. For example, a smoke detector in an apartment should not be located near the cooking facilities.

Detector sensitivity – the sensitivity setting of the detector is not set at a level that compensates for the ambient conditions. For example, a heat detector in the roof space of a building should have a lower sensitivity than that of a heat detector on the ceiling of the same building.

Untimely system maintenance – smoke detectors can become contaminated over time with dust and dirt. At some point the contamination will cause an unwanted alarm, this can be avoided by regular maintenance routines.

System reaction time – the activation time of an automatic system is generally between 3-10 seconds from the time the detector's sensitivity is

Picture courtesy of Ampac Technologies PTY. Ltd.

Picture courtesy of Ampac Technologies PTY. Ltd.

reached. Where appropriate, additional delays can be incorporated into the system design to allow an investigation to take place before the Fire Brigade is automatically notified.

To reduce the number of unwanted alarms the Fire Detection industry has evolved the technology used in both the detectors and the control panels. Currently there are four types of Fire Detection systems. The first is referred to as Conventional. These systems have been available for many years and although the appearance of the system components has changed dramatically, the system operation has not. Typically a building is divided into fire zones. Each zone is protected by 'Conventional' detectors, typically smoke or thermal types. Conventional detectors have two states, normal and alarm. The detector makes the fire/no fire decision based on a factory set sensitivity. The Fire Alarm Control Panel (FACP) has one appropriately labelled indicator per zone. When a detector goes into the alarm state the FACP indicator illuminates. When the Fire Brigade observe the FACP they can determine which zone the fire is in, but not which detector caused the alarm. This can mean a lengthy search within the zone to determine the exact location of the fire (or source of alarm). Conventional systems have provided adequate protection for a long time. Even now these systems can be the most appropriate choice when factors like building services interfaces, life safety, risk, budget and end client requirements are taken into consideration.

Addressable systems differ from Conventional systems in the following ways:

1. Each detector base has a unique address, a conventional detector head is inserted into the addressable base.
2. The FACP has a LCD display so that plain English messages can identify detector location, instead of an LED indicator identifying a zone location.
3. Detectors are cabled in a loop instead of terminating with an end of line device.
4. Keypads are used for panel control instead of discrete switches.

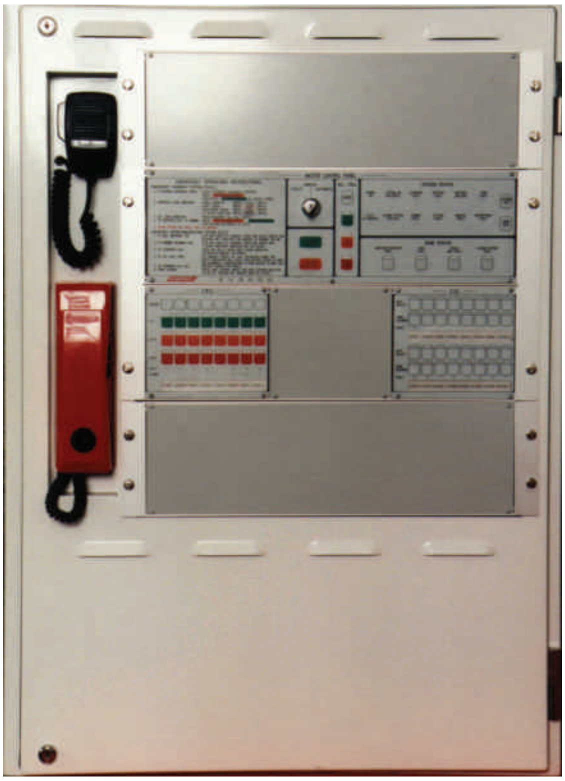
In an Addressable system the detector still makes the fire/no fire decision based on a factory set sensitivity. However, it is possible to implement delays (where appropriate) on a detector-by-detector basis. Addressable systems also offer benefits such as improved fault finding information and the ability to integrate with other building services through the use oh High Level Interfaces.

Analogue systems use similar FACP technology to that of Addressable systems. The difference between the two systems is enhanced detector technology. Each Analogue detector monitors the surrounding environment and sends a continuous stream of data to the FACP. The FACP makes the fire/no fire decision based on a sensitivity setting selected by the installer. Additional benefits offered by Analogue systems include; the indication of contaminated detector chambers, drift compensation for alarm settings and the facility for a pre-alarm warning. A pre-alarm will occur when the smoke/heat/gas level increases towards the full alarm set point, an intermediate set point can be used to give a "pre-alarm" signal at the FACP. This allows an investigation of the fire (or alarm source) to take place before the Fire Brigade is called and evacuation procedures take place. This is most beneficial at high security sites and sites that have a high concentration of people.

The final system type is termed Distributed Processing. The detectors in these systems utilise technology that is more advanced than that of Analogue detectors. Each detector has a powerful microprocessor that contains imprints (in the form of algorithms) of known fires. Generally each detector also has a combination of sensing elements, smoke/heat/gas. The information from each sensor is feed to the microprocessor for analysis. The fire/no fire decision is based on comparing the pattern of the current data with the predetermined fire patterns. The biggest advantage of Distributed Processing systems is that unwanted alarms can be reduced at the source.

FIRE ALARMS

Once a fire has been detected it is important that all occupants within the building receive adequate notification so that an orderly, safe evacuation can



Picture courtesy of Ampac Technologies PTY. Ltd.

take place. For many years bells were used as the primary method for this notification. While bells served their purpose and no doubt saved many lives they do have some deficiencies;

Other services use bells, e.g. lift alarms, security systems, school class changes etc. This can cause confusion in the event of an emergency or lead to the alarm being ignored.

A single sound is used, there is no opportunity to investigate the alarm, and occupants must evacuate on activation of the bell. Also, there isn't an efficient method of distinguishing between a routine test and a real emergency.

Bells consume a large amount of current compared to the alternatives, this means the control panels require large power supplies and batteries, making them more expensive.

The use of single tone, electronic sounders combated the need for large power supplies and batteries, they are also available with selectable tones to ensure that a distinctive tone for the environment is provided.

The next alternative is an electronic sounder that has two different tones. The first 'Alert' tone notifies occupants that there is a potential problem. A fire warden then has a predetermined time to carry out an investigation to ascertain if the fire is 'real' or unwanted. If the alarm source does not pose a threat to occupants then the system can be reset without having caused disruption. If the fire is real then the sounders will generate an 'Evacuate' tone, this signals to the occupants that an orderly evacuation process must take place. This two-tone strategy reduces the amount of down time and also ensures that occupant indifference is greatly lowered.

A more sophisticated alarm system incorporates loud speakers strategically located throughout the risk these replace the need for sounders or bells. The speakers are connected to the Fire Alarm Control Panel. In the event of a fire the speakers will generate an Alert and Evacuate tone, as described for the two tone electronic sounder. The additional benefit of the speaker is that a microphone can be fitted to the control panel. This allows the person responsible for managing the evacuation to announce important information to the occupants, such as, the location of blocked exits, or that the fire has been contained. The microphone also allows the maintenance company to announce that a test is about to take place. Further to this, digitised recorded messages can be inter-mixed with the two tones, these messages provide automatic advise to the occupants during the time it takes the person managing the emergency to arrive at the FACP.

Picture courtesy of Ampac Technologies PTY. Ltd.

Additional hardware can be added to the FACP to allow individual control of the Alert, Evacuate and Public Address for each fire zone. This allows an Evacuation sequence to take place – the zone at risk will be Evacuated first, followed by the adjacent zones, then the next closet zones, etc until the entire building is cleared. An Evacuation sequence is particularly important in high-rise buildings where the capacity of the stairwells does not cater for 100% of the occupants. In these cases a full evacuation without a sequence can lead to more injuries occurring in the stairwell than are caused by the fire.

The final option for alarms systems is to incorporate a dedicated intercom system for the person managing the evacuation (house warden) to communicate with nominated people within each fire zone (zone wardens). This allows the house warden to have up to date information on the cause of alarms, evacuation progress, medial requirements etc. Generally when a warden intercom system is required a dedicated control panel is provided for both the intercom system and the control of the warning tone system.

SYSTEM SELECTION

Before selecting a Fire Detection and Alarm System for a project it is recommended that you give some consideration to:

Technology – what level of technology is required for the particular building to meet the basic objective of saving lives and protecting property? Also, what technology is required to integrate the system with other building services?

Unwanted Alarms – does the system design and product selection minimise the risk of unwanted alarms? 'Off the shelf' designs should no longer be acceptable, each building should be individually assessed and provided with a tailored solution.

System Operation – can the control panel be easily operated by those managing an emergency situation? The expertise of personnel varies from building to building. It is recommended that a demonstration be arranged before the final decision is made.

Product Life – do the products being offered meet the requirements of the latest local rules and regulations? Are the products about to be superseded? It is recommended that a written guarantee be obtained from the manufacturer that the system will be supported for at least 10 years from date of installation.

Product Support – what experience does the manufacturer and the installer have with similar projects to that being undertaken? Is there a wide range of maintenance companies available to support the system once it has been installed? What is the lifetime cost of the system, including alterations and repairs?

The technology within the Fire Detection industry is continually changing to provide better project specific solutions and in particular to reduce the number of unwanted alarms. I urge all those involved within the industry and on the fringes of the industry to contact local manufacturers and suppliers for information and training on the latest products.

The new FC500C fire control panel from Alarmcom: Handicap zero.

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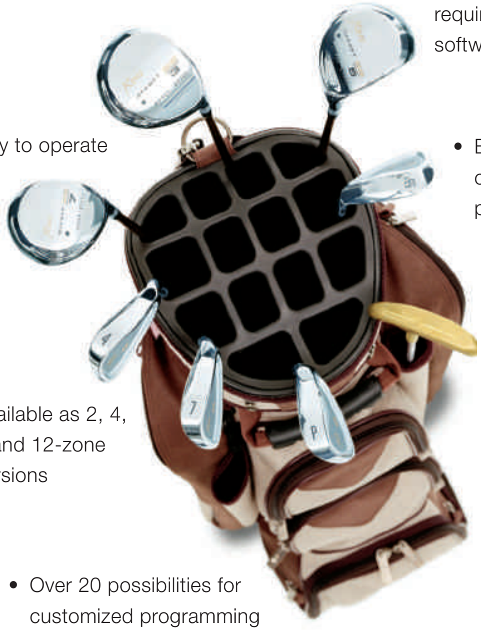

The new zero-handicap FC500C fire control panel gives you unbeatable performance plus an avant-garde design that sets new aesthetic standards. To find out more about the FC500C, visit us at www.alarmcom.com

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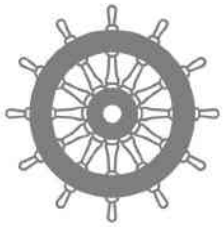
SOLAS CHANGES

SOLAS regulations change in July 2002 and will require ship owners to review, and probably increase, the number of Emergency Egress Breathing Devices (EEBD) on board.

Sabre have a global network of distributors and service centres to support their marine customers. They market a dedicated range of products, including EEBD and Self Contained Breathing Apparatus specifically designed for the Marine industry.

The Sabre ELSA emergency egress breathing device (EEBD) is easily stowed and instantly effective.



The Sabre SIGMA 2 instant positive pressure marine SCBA is approved to the Marine Equipment Directive.

Sabre have launched a dedicated website to inform the maritime industry of their products, distribution network and the details of the SOLAS regulation changes:

sabreba.com/marine

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Emergency Escape Breathing Devices

What are they and what do the new requirements mean?

Sabre Elsa. *Picture courtesy of Scott International*

ALTHOUGH TODAY THERE ARE FEW wooden sailing ships, with canvas, tar and powder rooms, fire remains one of the great hazards for sea-going personnel. Thankfully the risks have diminished as implementation of new legislation has taken effect, but fire still claims about 30% of casualties at sea.

by ***Michael Morton**,*
Senior Surveyor to Lloyd's Register

In the vast majority of cases it is not the flames but smoke that is the killer. The International Maritime Organisation has recently addressed this issue through its amendments to Chapter II-2 of SOLAS. The revised Chapter II-2 incorporates, for the first time, requirements for the provision of emergency escape breathing devices (EEBDs) on board ships.

An EEBD is an air or oxygen device used for escape from a smoke filled compartment. They are not to be used for fighting fires or entering oxygen deficient voids or tanks. SOLAS now requires that EEBDs of an approved type with valid certification are to be carried on board in addition to other breathing apparatus used for different purposes.

This article provides an insight to the new requirements and their interpretation, and details how to go about obtaining certification.

Regulations 13.3.4 and 13.4.3 of SOLAS Chapter II-2 give the requirements for EEBDs.

SOLAS also requires compliance with the Fire Safety Systems Code and MSC/Circ. 849 – 'Guidelines for the performance, location, use and care of emergency escape breathing devices'.

The Fire Safety Systems Code (FSS Code) is introduced by Resolution MSC.98 (73) and is also part of the SOLAS 2000 Amendments.

SOLAS REQUIREMENTS FOR 'NEW' AND 'EXISTING' SHIPS

A 'new' ship is defined as one on which the keel was laid or which was at a similar stage of construction, on or after July 1, 2002. Ships with keels laid prior to this date are defined as 'existing' ships.

'New' ships are to have EEBDs installed on delivery whereas 'existing' ships are to have the EEBDs installed not later than the first safety equipment survey after July 1, 2002.

New buildings, whose keels were laid before July 1, 2002 that are being delivered after July 1, 2002 are classed as 'existing' vessels. EEBDs would still have to be on board at delivery.

SOLAS now requires both new and existing ships to have EEBDs in the accommodation and machinery spaces. The requirements for accommodation spaces are quite clear, stating that all ships are to carry at least two within these spaces. However, the number and location of EEBDs within machinery spaces is not clearly specified – the regulations simply state that EEBDs are to be situated, ready for use, at easily visible places that can be reached quickly and easily at any time in the event of fire. Clearly the location of EEBDs is to take into account the layout of the machinery space and the number of persons normally working in the space (see interpretations below).

Fenzy Bio-S-Cape. Picture courtesy of Fenzy

In addition, 'new' ships are required to keep spare EEBDs on board. The number and location of EEBDs are to be indicated on the fire control plan.

Specific requirements for passenger ships:

In all passenger ships, two EEBDs are to be carried in each main vertical zone. For those carrying more than 36 passengers, two additional Emergency Escape Breathing Devices (i.e. a total of four) are to be carried in each main vertical zone.

The requirements for passenger ships do not apply to:

Stairway enclosures that constitute individual main vertical zones the main vertical zones in the fore or aft end of a ship, which do not contain accommodation spaces of minor, moderate or greater fire risk.

What the Fire Safety Systems Code says:

The FSS Code details the requirements for the design of EEBDs, their carriage, storage and donning procedures. It also states that EEBDs are to be capable of use for at least 10 minutes.

In summary, an EEBD must consist of a hood or full-face piece, which protects the eyes, nose and mouth. Hoods and face pieces are to be constructed of flame resistant materials and include a clear window for viewing. The face covering must be designed to form a complete seal around the eyes, nose and mouth and to be capable of being secured in position. A hood or a head covering is to completely cover the head, neck, and may also cover portions of the shoulders.

Instructions or diagrams clearly illustrating the use are to be printed on each EEBD, together with maintenance requirements, manufacturer's trademark and serial number, shelf life with accompanying manufacture date and name of approving authority. In addition, the 'wheelmark' should be affixed when the EEBD is supplied to EU-flagged vessel (to signify that it complies with the Marine Equipment Directive).

MSC/Circular.849 – guidelines for the performance, location, use and care of emergency escape breathing devices:

The MSC/Circular duplicates much of the FSS Code but it does indicate where EEBDs should be placed in the engine room. The circular states that unless personnel are individually carrying EEBDs, consideration should be given for placing such devices along the escape routes within the machinery spaces or at the foot of each escape ladder within the space. Control spaces and workshops located within the machinery spaces should also be considered as possible locations for the devices.

Training in the use of EEBDs should be considered as part of basic safety training. Note that training units, which are to be clearly marked, are not counted as being part of the number of units required on board.

EEBDs may also be used to escape from a machinery space due to an accidental release of a fixed gas system. They may also be carried by firefighters for the sole purpose of providing the device to personnel in need of emergency assistance.

INTERPRETATIONS

A number of national authorities have given their own interpretations as to the number and distribution of EEBDs to be installed on their vessels. These interpretations have to be adhered to for each flag state. At the time of writing the following countries have given interpretations: Bahamas, Belize, Brazil, Cyprus, Denmark, Greece, Hong Kong, Isle of Man, Liberia, Malta, Marshall Islands and Panama.

There are two separate philosophies over the use and hence the positioning of EEBDs, depending upon whether they are intended for accommodation or machinery spaces. It is not intended that there be EEBDs for every person on board.

Within machinery spaces, the onus is on escaping personnel to don the EEBDs themselves.

As required in the MSC Circular, EEBDs should be positioned at the foot of ladders in the engine room and in control rooms, workshops, etc. There should be a sufficient number of EEBDs in the space to cater for the personnel who could be present in that area.

Lloyds Register has had many enquiries on this requirement. It is very difficult to give general guidance on this issue as virtually every engine room will differ in size and arrangement. The number and position of EEBDs in the engine room must be assessed for each vessel.

There are however some points which are worthy of note in deciding upon the position and number of EEBDs:

As personnel within the engine room are expected to don the devices

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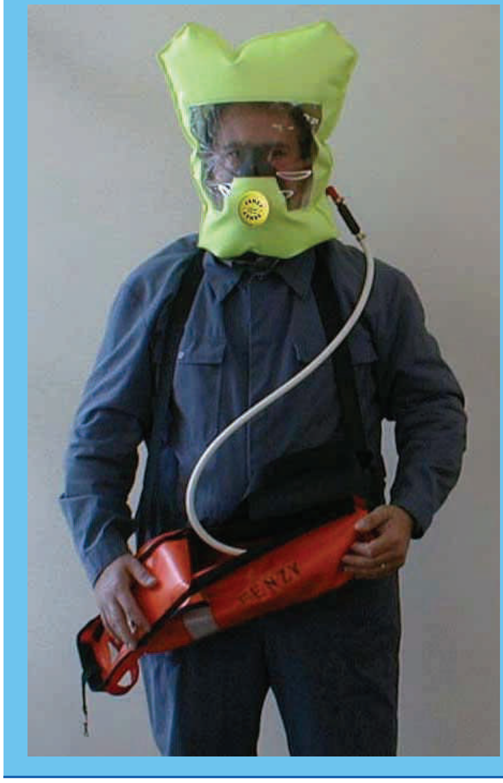

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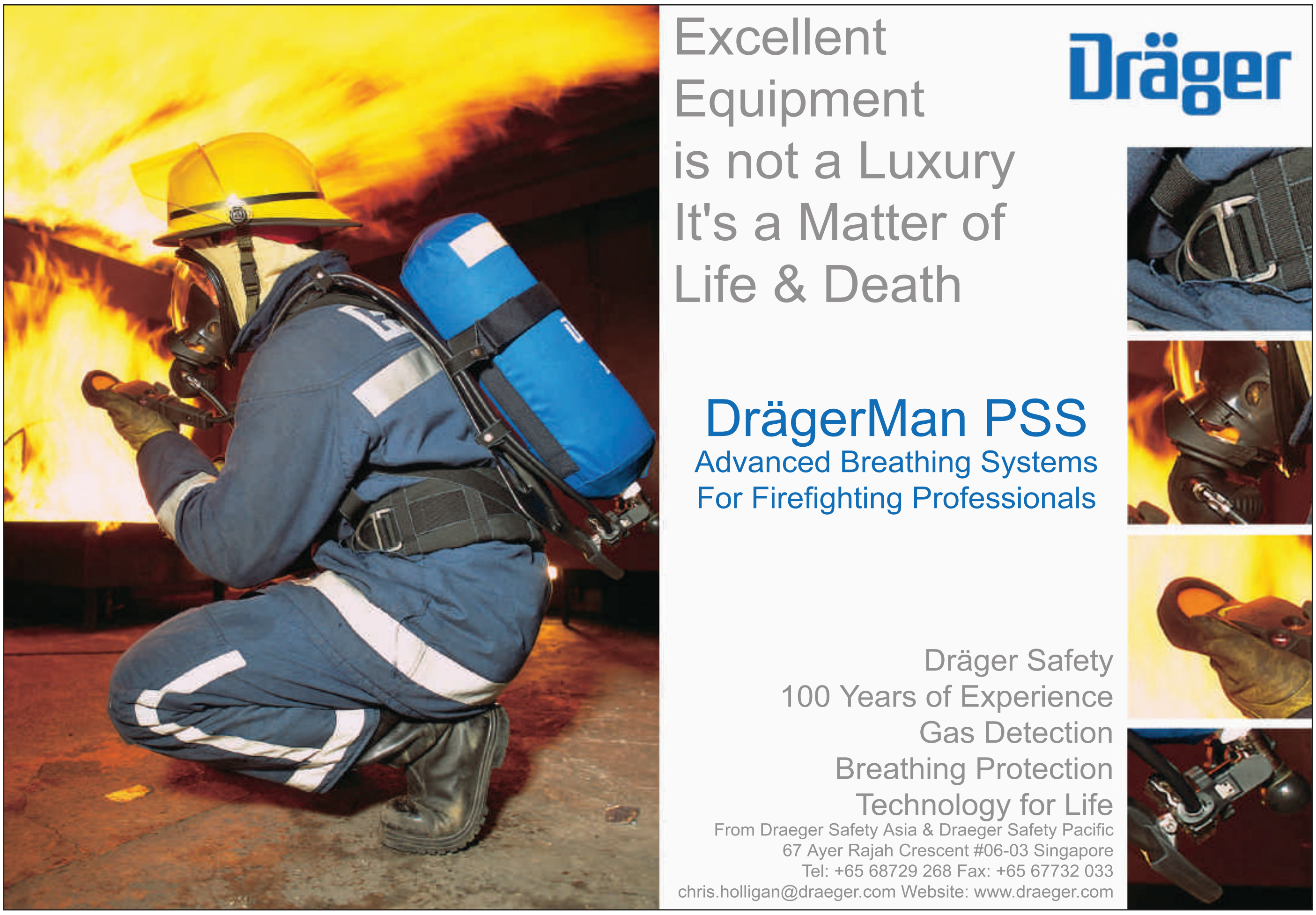

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Draeger Saver CF. Picture courtesy of Draeger Southeast Asia PTE. Ltd

themselves, there is little point in positioning them near exit points. In addition anyone near an exit would hopefully be able to effect an escape. The bottom of the ladders at the bottom of the engine room is a logical position for placement, with the number dependent on the number of personnel likely to be working there at any one time. A situation where only one EEBD is immediately available for three personnel, for example, is not desirable. The base of ladders at each flat level would also be a good position for stowage. The designer of the arrangement of EEBDs should be conscious that there is little point in trying to get to an EEBD if it is on the flat below or on the other side of the engine room.

One flag interpretation requires that the number of EEBDs to be provided in the machinery spaces is to be equal to the number of crew stipulated in the *Document of Safe Manning* for the engine department. The maximum number however, need not exceed eight devices. Another has stipulated a minimum of four EEBDs, with two in the control room and one by each escape ladder.

It is of course important that all personnel are trained, as required by SOLAS, in the use of EEBDs and are familiar with their positioning within the engine room.

Within accommodation spaces, it is anticipated that EEBDs will be taken to trapped personnel by the rescue party in order to effect a safe escape. It is logical therefore to store the accommodation space EEBDs with the rescue party equipment. This also has the advantage of making EEBDs available to the fire fighting party attempting a rescue of someone overcome by CO_2 in the engine room.

The number of spare EEBDs to be provided has been a contentious issue, with many flag states giving their own interpretations. There are ongoing discussions at IMO about this issue and whilst these are not finalised, the indications at this stage can be summarised as follows:

- for a cargo ship, at least one spare EEBD is to be carried on board
- for a passenger vessel, two spare EEBDs are to be carried on board irrespective of the number of passengers being carried.

The EEBDs carried for training purposes are in addition to the complement required on board.

CERTIFICATION

Lloyd's Register issues certificates of type approval for EEBDs upon satisfactory examination of test reports, for any appropriate national or international standard. Any accredited test laboratory can carry out the testing. Accreditation for carrying out such testing is obtained from a national authority.

The standards, that have been proposed for European certification, which give requirements and details for testing and marking are:

EN 400 (1993) – Respiratory protective devices for self-rescue – Self-contained closed-circuit breathing apparatus – Compressed oxygen escape apparatus.

EN 401 (1993) – Respiratory protective devices for self-rescue – Self-contained closed-circuit breathing apparatus – Chemical oxygen (KO_2) escape apparatus.

EN 402 (1993) – Respiratory protective devices for escape – Self-contained open-circuit compressed air breathing apparatus with full face mask or mouthpiece assembly.

EN 1146 (1997) – Respiratory protective devices for self-rescue – Self-contained open-circuit compressed air breathing apparatus incorporating a hood (compressed air escape apparatus with hood).

EN 1061 (1997) – Respiratory protective devices for self-rescue – Self-contained closed-circuit breathing apparatus – Chemical oxygen ($NaClO_3$) escape apparatus.

Where the above standards give options as to a mouth-piece assembly, full-face mask or hood, only the full-face mask or hood versions are acceptable as EEBDs.

For further details on certification, contact Lloyd's Register's Statutory Marine Support Group:
Tel: +44 (0)20 7423 2049
Fax: +44 (0)20 7423 4246
E-mail: DCG-Stat@lr.org

REFERENCES

IMO Resolution MSC.99 (73) – Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974, as amended.

IMO Resolution MSC.98 (73) – Adoption of the International Code for Fire Safety Systems.

IMO MSC/Circular849 – Guidelines for the performance, location, use and care of emergency escape breathing devices (EEBDs).

Michael Morton is a Senior Surveyor to Lloyd's Register. He has been employed by Lloyd's Register in statutory work since 1982 and has worked on fire safety related issues since 1990.

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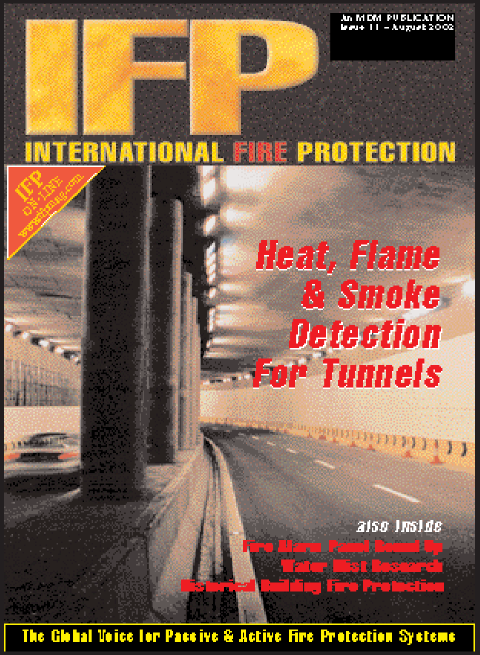
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The FireFox features a variety of nozzle options including a standard electric fog/straight stream, a unique flat fog/straight stream, and various smooth bore options with stream shaper, along with an add on dry chemical nozzle. The fog/straight stream nozzles are available in adjustable flows with an electric flush as well as fixed flows that can be specified by the customer.

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BANGLADESH ON THE MOVE

Since its independence in 1971 from Pakistan, the small nation of Bangladesh has pursued its struggle to improve the everyday existence and build an infrastructure that provides a gateway for its residents, visitors and products through their two International Airports in Dhaka and Chittagong.

As part of these improvements, the Bangladesh Civil Aviation Authority embarked on a mission to provide enhanced protection for its traveling public by beginning to replace an aging fleet of older Simon ARFF's throughout its airport locations in 1997.

As part of that process over the last five years they have received a number of new ARFF vehicles to protect their airports. The most recent addition to their fleet was a new 6x6 unit from US manufacturer E-One, in March of 2002. Other orders were also placed for another two 6x6 Monitor Platform vehicles Platform in May and July. These units will be in addition to other 4x4 and 6x6 units purchased from E-One through their dealer UNIMECH Limited, located in Dhaka, the capital of Bangladesh over the last 5 years.

The newest two units on order from E-One will utilize their Monitor Platform Technology, which is so popular in the Pacific-Rim. The units will have 10,030 liters of water, 1325 liters of AFFF foam and 225kkg of dry chemical agent for deployment through the pre-piped handlines. The unit will also employ the use of a bumper mounted turret with remote control joystick located inside the vehicle. The cab of the unit will provide seating for four (4) ARFF fire fighters with roof platform access through a sliding hatch in the cab of the apparatus.

Both of these new units will utilize E-Ones state of the art independent suspension, which will enhance stability and maneuverability of the units while in emergency response or while maneuvering around congested Airport apron areas.

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VIETNAMESE TELECOMS COMPANY OPTS FOR MACRON'S FIRE PROTECTION

British fire protection specialist, Macron, has supplied Vietnamese telecommunications company, SLD Telecom, with its Hygood FM-200 fire suppression system to protect the company's new mobile telephone operations based in Ho Chi Minh City. Approved distributor, Singapore-based, Getz Bros. & Co, negotiated the order, which is expected to lead to a further 70 installations for SLD Telecom spread throughout Vietnam.

According to Macron, the ability to complete the Hygood FM-200 installation within a very short timescale was a major factor in the selection of the Hygood FM-200 system, as was the on-site technical support provided by Getz Bros staff based in Vietnam.

SLD Telecom also cited technical and performance considerations as being major factors. Should a fire occur and the FM-200 installation be activated, the discharge of the gaseous suppressant will neither damage the delicate telecommunications equipment nor endanger the lives of the staff or firefighters. Hygood-FM-200 leaves no oily residue or deposits and it is neither conductive nor corrosive. Also, at its design concentration of just over seven percent by volume, the gas does not deplete the oxygen level to a point harmful to the room's occupants.

Getz Bros' Trinh Tri Thanh says that the system's cleanliness, safety and environmental credentials also impressed the telecommunications company. Hygood FM-200 does not deplete the ozone level and so, following a discharge, the installation can be vented to atmosphere without any negative impact on the environment. This environmental awareness has won Macron international accreditation from organisations such as FM [Factory Mutual], UL [Underwriters Laboratories] and LPC [Loss Prevention Council].

This order from SLD in Vietnam is the latest of a growing number of major Hygood FM-200 installations in the international telecommunications sector. Other recent contracts have included projects in the UK, Turkey, South Africa, the Emirates, Greece and China.

For more information, please contact:
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The UK based company attributes its success in the region partly to being able to deliver the exact decon technology that is needed by emergency services there and partly to the fact that it sells through local distributors knowledgeable in this sector. Currently Plysu is looking to appoint distributors in China and is open to discuss the possibilities.

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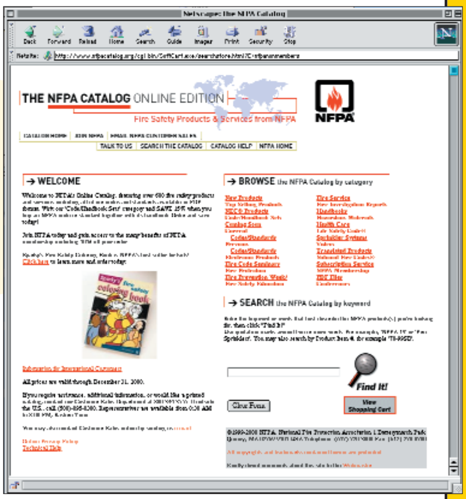
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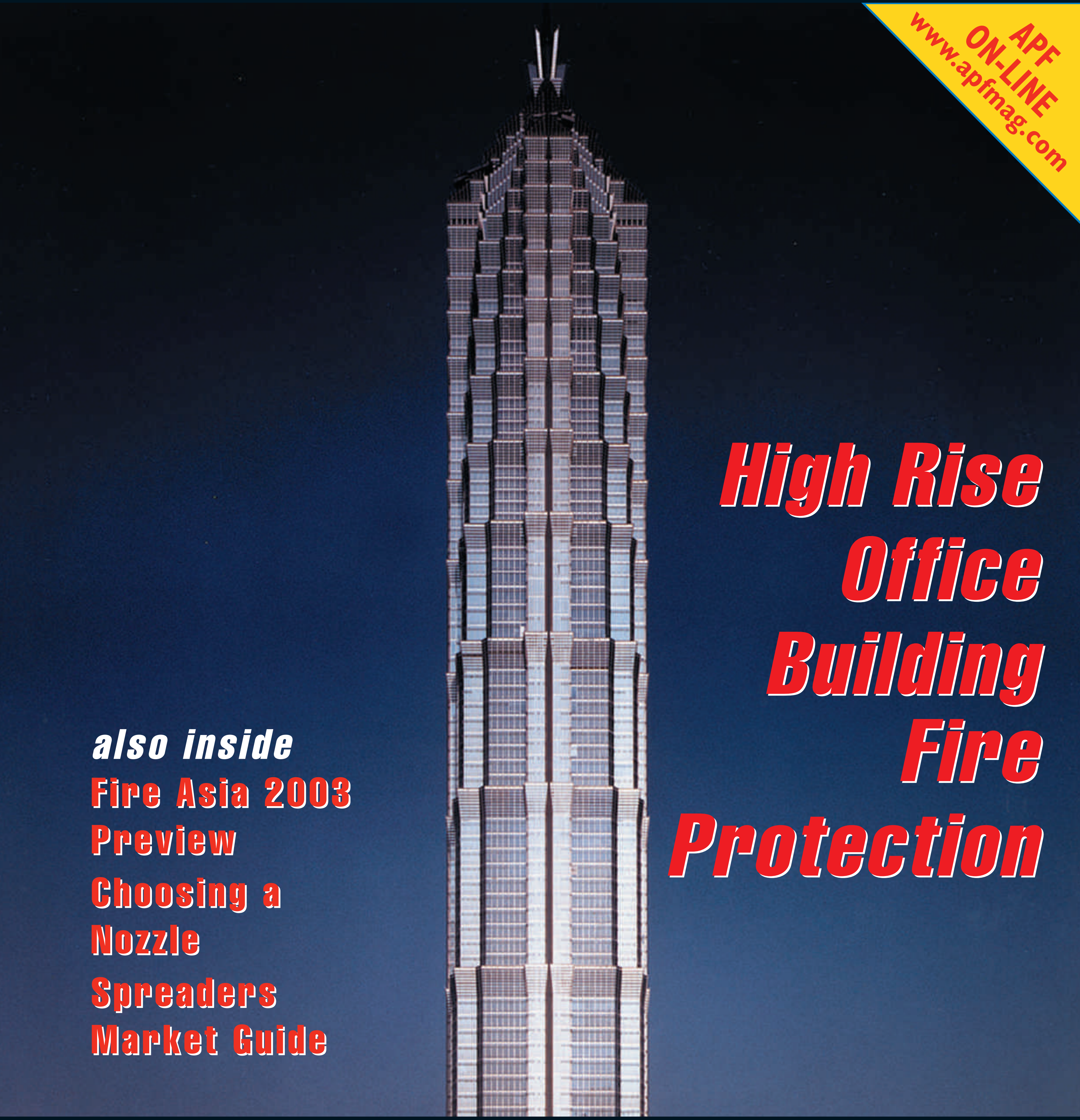

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Front cover picture: Jin Mao building in Shanghai, PR China. Picture courtesy of Rolf Jensen & Associates

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NFPA INTERNATIONAL

FOREWORD

by Jeff Godfredson

NFPA's Asia-Pacific Operations Director

WHEN I FIRST started to give thought as to the subject of this editorial I had decided not to talk about terrorism and large fires in public places involving loss of life. Unfortunately events of recent weeks make me feel obliged to make some comments.

Firstly the issue of terrorism has once again been brought home to us all by horrific events on both sides of the world. The bombing of innocent civilians in Bali, Indonesia and the hostage crisis in Moscow, Russia again remind us all of the vulnerabilities we all face as we go about our daily lives. In my discussions with colleagues it is clear that the enormity of these events is difficult to comprehend. It is when it becomes personal through the death of a work colleague or friend that the full impact of these tragedies can be felt on a personal level and then magnified by the large numbers of casualties.

I am surprised by the sentiments of some in the Emergency Services who still feel "this could not happen here". I strongly believe it is incumbent on all in the emergency services to start thinking the unthinkable and ask the hard questions. How well would we have coped it this had happened here? It is a sobering exercise to walk through these scenarios and examined the resources required to deal with events on this scale. There is a need to think through all of the agencies who may be involved. It may include Police, Fire, Military, Health, Politicians, Media, and Diplomats to name a few. How well do these agencies/groups interact, do they have plans for joint operations, have these plans been updated and practiced. If the answer is "I do not know" now is the time to act. When you are the one confronted with one of these disasters it is too late to plan. Communities are far more interested in Preparedness than trying to apportion blame after an incident has been badly handled. Unfortunately there are many examples of significant events we can use as examples from which to learn. You do not have to have had the incident in your backyard to learn the lessons, both what to do and what not to do.

Secondly I need to refer to a large fire in Hanoi, Vietnam, which appears to have killed over 100 people. Events such as this are avoidable. We know the problems and we know the solutions. As societies developed and urbanized there were fire disasters, which occurred and as a result altered Legislation. It is interesting to look at the history of large loss of life fires and to see the changes to the law, which follow. We know what happens inside a building when it catches fire. If there are inadequate or blocked exits, no means of suppressing a fire and no training we should not be surprised when people die in large numbers when fires occur in such buildings. Codes such as NFPA 101 (Life Safety Code) clearly outline the steps required to ensure safe egress from buildings in the event of fire or other emergencies. It is interesting to see that the precursor to the NFPA Life Safety Code started in 1913. Why are events such as this still occurring in 2002?

One of the current management buzzwords is Risk Management. Use of this concept has to extend to include the well being of employees and members of the public who may enter a building. How many managers are truly aware of the safety of the buildings they occupy; particularly but not limited to those in developing economies. How many business travellers or holidaymakers are aware of the safety of the hotel in which they intend staying on their next trip? Until the public and consumers demand more it appears little will change.

Jeff Godfredson
NFPA's Asia-Pacific Operations Director

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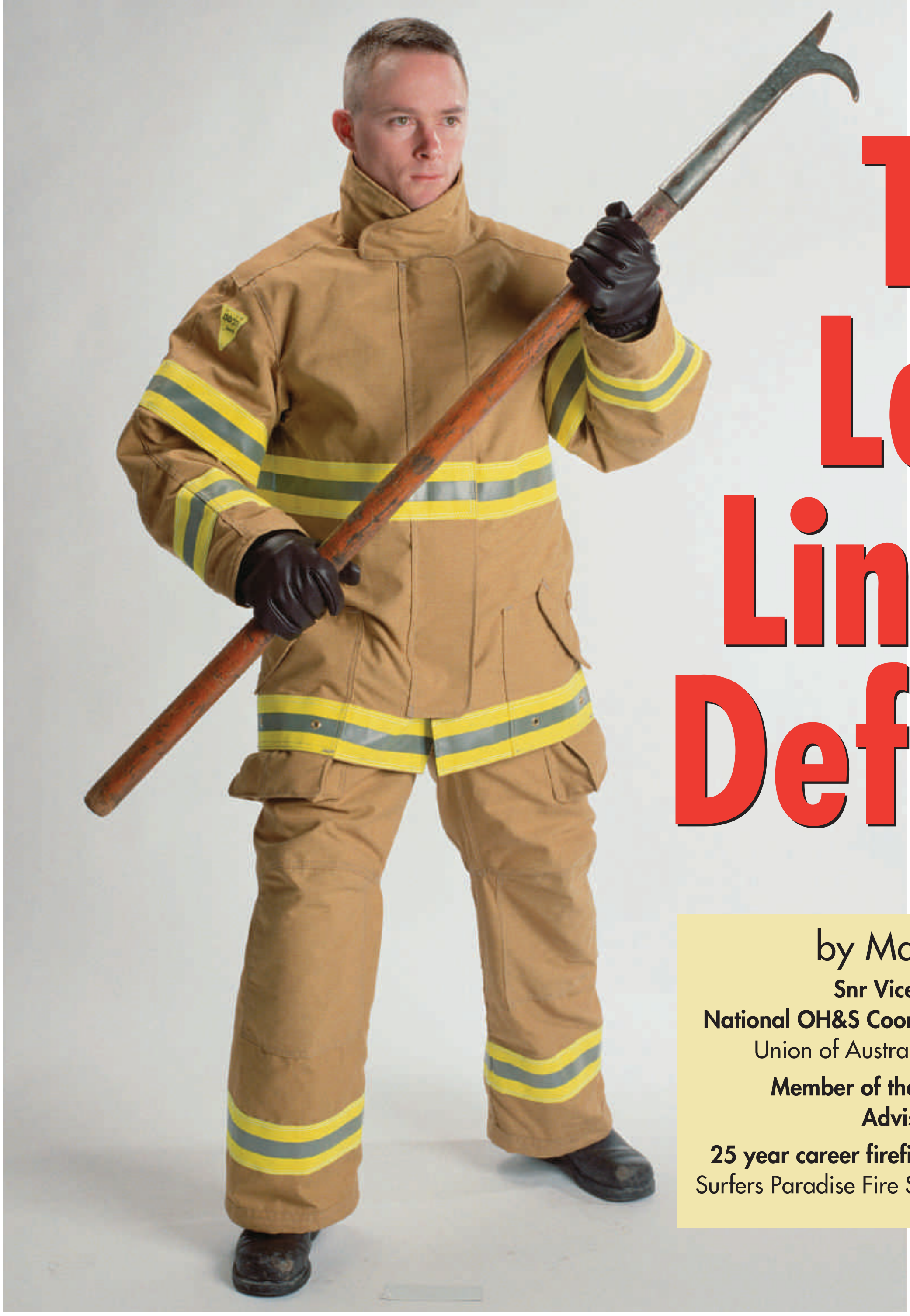

The Last Line of Defence

by Mark Gribble

Snr Vice President and
National OH&S Coordinator – United Firefighters Union of Australia, Queensland Branch

Member of the Emergency Services Advisory Council

25 year career firefighter and Station Officer @ Surfers Paradise Fire Station, Gold Coast, Australia

Picture courtesy of Lion Apparel

What is the difference between an off duty firefighter and a member of the public?

Clearly there are elements of training, knowledge, skills, fitness, and PPE (personal protective equipment) etc, which separate the two groups. However to diminish any one of these without due consideration of all of the elements which constitute the difference between civilians and firefighters, is fraught with danger.

Physiologically, what is the difference when a firefighter is on duty?

For many years I have used the argument that physiologically there is very little difference. Therefore it has always bewildered me why some decision makers, bean counters or bureaucrats while insisting on purchasing inappropriate PPE, still expect **firefighters to run into a burning building, while members of the public run out.**

Just as a single focus on budget drives down quality and therefore efficiency and effectiveness, so to does employing an isolated focus when purchasing PPE. Which brings us to the subject of this paper.

What other factors/issues or equipment do we need to consider when we purchase an element of PPE?

Does the decision form part of a larger long-term strategy, which is designed to enhance firefighter comfort, efficiency and therefore performance and ultimately their safety? Is it directly linked to a comprehensive risk assessment and task analysis?

Does it give due consideration to culture and history of how firefighters have conducted and delivered their profession? Is there a Change Management Process applied to the transition? (ie education, information, training etc prior to the introduction.)

Many of you will already be able to answer these questions from your experience to date. However if we as a firefighting industry are to get it right for the firefighter of the future, then we must first recognise a number of issues;

- We are all living in a time when all organisations are trying to "do more with less".
- This in turn means we live in times of change.
- Therefore firefighters need to be "agents of change" so as to enhance their safety and general working conditions.

If firefighters and fire service managers alike share this notion, then we clearly need to prioritise our expenditure of the public purse. Money paid by the public, whom I spoke of earlier who have an expectation that we will enter into the hostile environment, from which they are trying to escape.

As I research firefighters fatalities and injuries from around the world, it seems that it is often during interior structural firefighting or SAR activities, that urban firefighters are effected the most. While the figures coming from the *2001 Firefighter Fatalities* published by the NFPA, show that the highest is still from heart attacks (40%), the remaining are also disturbing.

- Internal Trauma – 27%
- Asphyxiation – 15%
- Other – 7%
- Burns – 4%
- Crushing – 3%
- Drowning – 3%

While burns only constitutes 4%, the 4 listed above burns, can also be influenced by personal protective clothing (PPC) and/or PPE.

Where did these incidents take place?

- Fireground – 38%
- To or from alarms – 24%
- Other on duty – 23%
- Training – 12%
- Non-fire emergencies – 2%

There is another question that should always be considered on the incident ground. **"Does the potential risk from our actions out weigh the potential gain?"**

Fixed property use:

Picture courtesy of Lion Apparel

- Vacant, Special (This includes idle buildings, under construction or demolition structures) – 18.1%
- Public Assembly – 12.9%
- Stores/offices – 12.9%
- Storage – 8.8%
- Manufacturing – 6%
- Residential – 3.7%
- HealthCare/correctional – 2.4%

It also seems that there are some common issues, such as;

- Communications
- Incident command issues including accountability
- Minimum safe crew sizes
- Dynamic risk assessment (risk v gain)

Therefore if these issues appear to be constant over the past few years, then PPE is indeed our last line of defence and we need to have in place, or work towards the "best" PPE, while we are endeavouring to address the above listed issues.

What is the best PPE?

I suspect it is the PPE, which is the direct result of a comprehensive consideration of all the associated elements of clothing and equipment. This would deliver up a **totally integrated** approach, where each piece enhances and complements the others. For example, **do communications have any thing to do with PPC?** The answer is yes. For if any equipment is used in conjunction with the PPC it needs to be considered when purchasing either the PPC or the equipment. Perhaps the best example of this can be found in the association between structural firefighting gloves and portable radios.

Once a fire service is confident they have found the glove, which offers the best protection, and dexterity and still firefighters have trouble with little buttons, perhaps manufactures and purchases need to consider industry specific models for use with a gloved hand.

Does the width of the leg on overpants really matter?

Yes and for a number of reasons. Airflow is always an issue when selecting turnout gear. However if a fire service has allowed itself to have mixed strategies on purchasing firefighting boots, then they may even see firefighters trying to push general-purpose boots through the leg of a pair of overpants, which were originally designed to be used with top boots. Ironically this leads to the potential for ankle injuries. The very support, which firefighters were seeking

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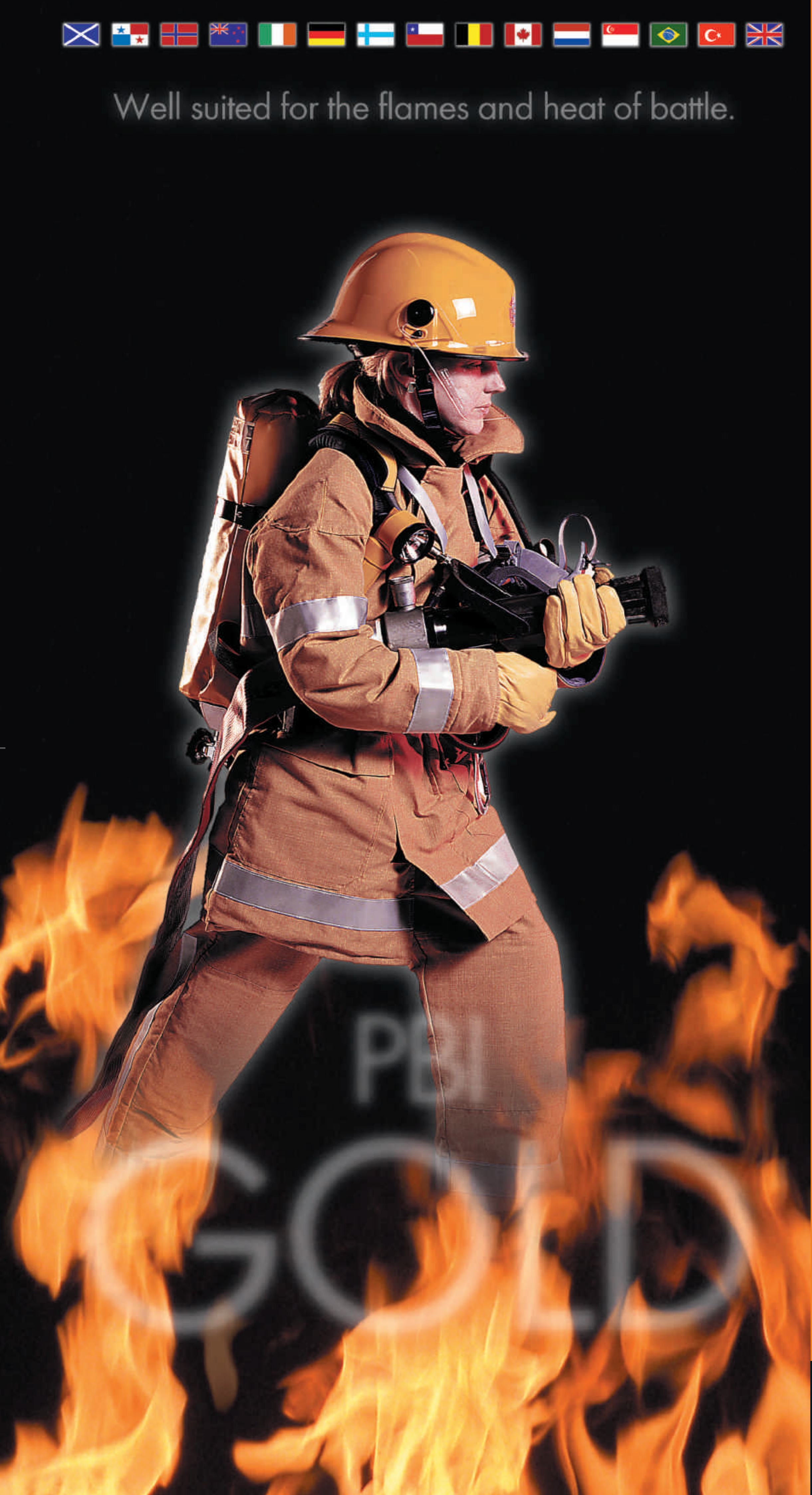
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from a zip/lace pair of GP boots, is lost when having to wear them unzipped around the station, to allow for a quick turnout response. All of which gives no consideration to station contamination issues. From this we see it may not matter which style of firefighting boot a department purchases, it just needs to be compatible with the associated PPE/PPC and enhance the way they conduct their business.

Additionally good PPE purchasing will be the result of a comprehensive risk assessment, task analyses and training/operational strategies analyses.

Those departments who have highly resourced and aggressive/offensive attack strategies, may feel they need higher thermal protection. However there is a critical balance between thermal protection and metabolic heat release. For well over a decade there has been much research, debate and improvement on this very issue, until we are seeing combinations of materials, which can deliver up a balance of high T.H.L. (Total Heat Loss) of 250 to 300 W/m^2, while maintaining a Thermal Protective Performance (T.P.P.) of 35 to 38. (Australia and Europe often refer to H.T.I.)

A comprehensive risk assessment will take into account fireground tactics, percentage of non fire or other emergency calls, the ability to dress down safely, injury statistics, department demographics, standards of fire cover, and environmental issues.

What part does culture and history play in PPE purchasing?

While lightweight products from helmets to PPC were consistently worn in Australia over the last few decades, they rarely met any standard, either Australian or overseas.

While lightweight is a desirable feature in PPE/PPC, the transition of upgrading sometimes meant a slight increase in weight, which was opposed by some firefighters.

Even changes to a lighter and more visible colour were opposed by some firefighters and purchasers, because it would show the dirt. However this was a very deliberate change and turnout gear is now getting cleaned at an appropriate rate. Therefore firefighters are no longer carrying around the carcinogenic and poisonous products of combustion in their turn out gear.

Cultural opposition even occurs when flash hoods are introduced into departments. This was seen in a number of countries when some firefighters thought it was "ok" to protect the rest of the torso, but leave the body's computer (brain/head) exposed. Interestingly firefighters ears and necks have contributed significantly over the years to the injury statistics of many a fire department.

Picture courtesy of Lion Apparel

However due to improved training in fire dynamics, a better understanding of their PPC and thermal camera use, firefighters are often choosing to protect their "once only thermal detectors" (their ears) rather than using them to check the surrounding air temperature.

It is encouraging to see research and development within this country expanding the boundaries of technology. The ability to combine many aspects of telemetry into an "add on" style package may prove to be a quantum leap forward.

Telemetry used in fireground accountability as an integral extension of communication, could give some if not all of the following features.

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Historically most of these individual features have been available in Australia, but for some, the exchange rate and import tariffs have seen purchasers reluctant to commit.

In summary the purchase of "shiny bells and whistles" has always captured the interest and imagination of firefighters worldwide. However if in the future we give due consideration to the "whistles" when we are purchasing the "bells" (metaphorically speaking) we may just achieve a truly integrated approach. If this philosophy is combined with a comprehensive risk assessment, then the firefighters of the future will be well equipped to tackle the hostile work environments, which they encounter.

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Protecting Flammable Liquids: Awareness & Adaptation

by Jack Woycheese,
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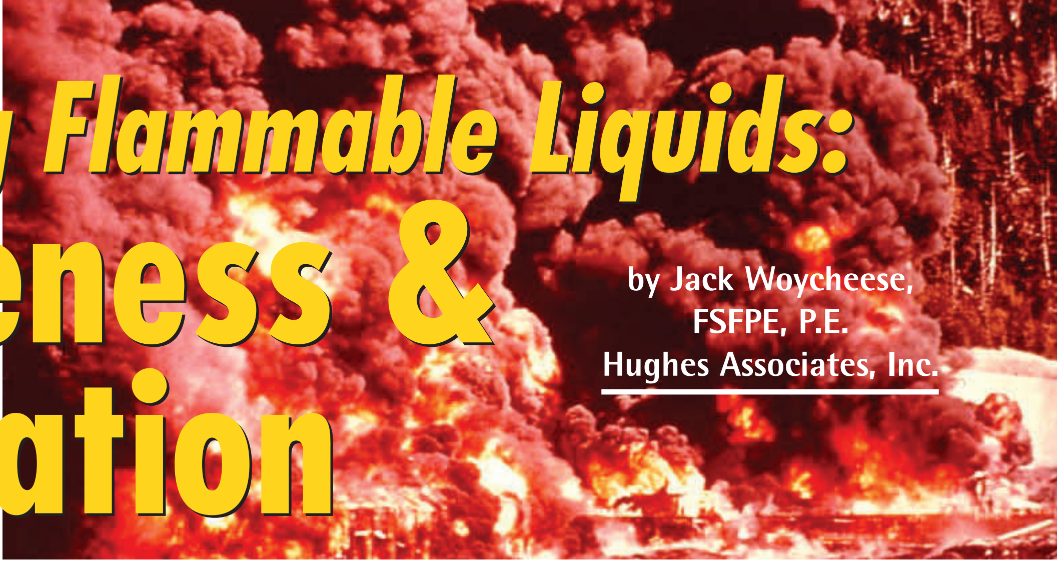
Hughes Associates, Inc.



Hydrocarbon Fire. *With permission of National Fire Protection Association*

In the recent best seller, *Who Moved my Cheese?*, Spencer Johnson, M.D., presents a parable to illustrate change, the reasons behind change, and varied reactions to change. We draw the conclusion that awareness and adaptation are among the keys to survival.

The flammable liquids and petrochemical industries are aware of the changing business environment. Let's look at adaptations of these industries over the past 15 years and the changes they have weathered:

- Experienced workers have retired and, through this attrition, the average experience level has decreased.
- The number of employees – administrators, operators, maintenance personnel, and inspectors – has decreased in response to reduced market conditions and resultant lower margins.

At the same time, plants, once located in the proverbial boondocks, now find that they have new neighbors. These neighbors question the wisdom of locating refineries and petrochemical plants adjacent to schools and housing – ignoring the fact that the plants preceded local growth and encroachment.

Add to the mixture the well-documented results of such issues as:

- Cyclohexane at the Nypro plant at Flixborough, UK in 1974
- Methyl isocyanate at the Union Carbide plant in Bhopal, India in 1985
- Paint-products pollution from the Sherwin-Williams Paint Warehouse Fire, Dayton, Ohio in 1987
- Pesticide-contaminated firewater at the Sandoz Chemical Plant Fire, Basel, Switzerland in 1986

and you make a strong case for responding to change in a positive and effective manner.

REACTIONS TO CHANGE

As a result of reductions in personnel, the approach to routine operations, maintenance, and inspection has changed.

- Process controls are now automated by computer to enable fewer people accomplish the work of formerly great numbers of employees.
- Participation by industry in the codes and standards process has decreased as budgets and manpower issues force more focus on the daily production requirements.
- Maintenance databases, reliability data, and probabilistic approaches have reduced levels of inspection and maintenance.

INDUSTRY AND GOVERNMENT RESPONSE

The concerns about the effects of products of combustion or chemical releases on the nearby public, combined with the aforementioned incidents, sent a wake-up call to flammable liquids industry to focus on public safety.

Industry and governments responded with mandates for more rigorous methods to incorporate fire safety elements properly into design and operations and to document these elements preparatory to facilitate audits for acceptability.

The American Petroleum Industry prepared a program, published as *API Recommended Practice 750, Management of Process Hazards*. This recommended practice essentially parallels similar programs from several professional organizations: the U.S. Occupational Safety and Health Agency – *Process Safety Management of Highly Hazardous Chemicals*, the American Institute of Chemical Engineers' Center for Chemical Process Safety's *Process Safety Management*, and CONCAWE's *Methodologies for Hazard Analysis and Risk Assessment in the Petroleum Refining and Storage Industry, Report No. 10/82*, and the NFPA 30 *Flammable and Combustible Liquids Code Section 5.12, Management of Fire Hazards*.

> *The concerns about the effects of products of combustion or chemical releases on the nearby public sent a wake-up call to flammable liquids industry to focus on public safety*

Each of these programs contains the same basic principles, recommended for incorporation into plants' fire safety programs and listed alphabetically below:

- Assurance of the quality and mechanical integrity of critical equipment
- Audit of process hazards management systems
- Emergency response and control
- Investigation of process-related incidents
- Management of change
- Operating procedures
- Pre-start-up safety review
- Process safety analysis
- Process safety information
- Safe work practices
- Training

IN THIS ARTICLE...

While we cannot address all elements of fire safety design and operations in this article, we will look at changes to some of them, which are currently generating interest: system safety, training, performance-based design, water mist, emergency response planning (ERP), and Class B firefighting foam.

SYSTEM SAFETY

The proper and continuing application of the elements of *Management of Process Hazards* (MPH) to any plant's fire safety program not only provides essential information about the weaknesses in the plant's design and operation, but also establishes a firm basis for employee training and understanding.

This MPH supplements the old, but tried and true mantra that we must focus not on the worst-case scenarios, but rather on the *prevention* of such scenarios. We must assure that knowledgeable, trained, and experienced people design, construct and inspect, maintain and operate plants and facilities so that any releases are minor and easy to control.

From a fire protection standpoint, to

As society increasingly encroaches on the plot limits of plants, performance based designs have become a means of rationalizing spacing for new and existing facilities.

keep releases to the minor level, we must assure that the design allows for:

- Rapid isolation and shut down, with adequately designed drainage and pressure relief
- Fire suppression systems to protect against fire exposure to flanges and other sources of additional release of flammable materials

Such an approach helps to minimize the spread of fire and to prevent major damage to valuable equipment, structural supports, instrumentation and cable trays, or other essential elements of the plant.

Recently, we have demonstrated that applications of MPH even to relatively small operations are valuable to management, operations personnel, and the public. One application involved a transit system's new liquefied natural gas (LNG)/compressed natural gas (CNG) storage and bus refueling facility. Results provided authorities and operations personnel with a level of comfort about the new technology.

TRAINING

According to MPH, training of employees may be based on codes, standards, regulations, and operating procedures to assure that those employees gain a fundamental understanding of the process and the safe operation, inspection, and maintenance of the process.

API RP 750 states that the training must be conducted:

- Initially, to assure that persons assigned to operate the facility have the required knowledge and skills to carry out their duties and responsibilities, not only during normal operations, but also during start up and shut down
- Periodically, to assure understanding and adherence to current facility operating procedures, and whenever equipment, procedures, or personnel change

Owners must document training as part of the preparation for required audits, which verify that plant owners are administering the program properly. New web-based programs enable owners to more easily and cost-effectively provide and document the required training, including tests of proficiency.

An additional benefit is that these test results may help to identify and qualify participants for higher paying positions and increased responsibilities.

PERFORMANCE BASED DESIGNS

Codes and code authorities are increasingly accommodating performance based designs. The new International Building Code, the new International Fire Code, the developing NFPA 5000 building code, and the NFPA 30 Flammable and Combustible Liquids Code have added wording to facilitate the application of performance based designs in those circumstances under which prescriptive designs are not readily applicable.

As society increasingly encroaches on the plot limits of plants, performance based designs have become a means of rationalizing spacing for new and existing facilities. Modeling of releases, pool fires, radiant heat levels, flammable vapor cloud travel, blast effects, and BLEVE (Boiling Liquid Expanding Vapor Explosions) effects from reasonable incident scenarios enable greater technically based scrutiny of plant exposures.

Modeling has become more comprehensive, with impressive graphical displays illustrating what once required reams of computer paper. We have also become increasingly dependent on computer validation of our conclusions and decisions. Although these models now show results in a much more user-friendly format, the limitation of any computer program is, of course, that someone must enter the proper data correctly and into the correct model.

Unfortunately, owing to the many demands on governmental monies, organizations such as the U.S. National Institute of Science and Technology are struggling to fund such efforts to validate computer models. We do need this research to build the confidence of the public and authorities in the calculated analyses of releases.

WATER MIST FIRE PROTECTION SYSTEMS

The flammable liquids industry is now adapting water mist fire protection systems to protect flammable hazards. On Alaska's North Slope, water mist systems are replacing Halon 1301 in new construction of gas compressor modules, turbine enclosures, NGL pump rooms, and chemical injection skids. The hazards in these modules include fire in lubricating oil systems for the turbines, compressors, and pumps. Fuel may release as atomized sprays, creating spray fires, or as liquid spills, creating pool fires.

Water sprays from standard sprinklers or badly managed hose streams cannot extinguish spray fires. Water sprays could, however, agitate the fuel surface of pool fires and intensify burning, a problem that does not arise with properly designed water mist.

The major benefits of water mist arise from oxygen displacement by water vapor, and radiation attenuation. In machinery enclosures, however, other mechanisms combine to contribute to fire control:

- Flame cooling
- Cooling of vital equipment
- Cooling the fuel below its vaporization temperature
- Vapor dilution

In addition to controlling lubricating and fuel oil fires, water mist has potential benefits for mitigating the hazards of gas releases. Pre-emptive application (i.e., injecting mist before ignition) of a water mist system can increase the energy required to ignite released gas. Increasing the ignition energy is equivalent to increasing the lower flammable limit of the released gas.

DESIGN CONSIDERATIONS

Careful design of water mist systems is essential to assure that the characteristics of the system (e.g., droplet size or pressure) do not inadvertently add to the post-release risk.

Some water mist systems cycle the spray on and off and include a built-in off cycle, lasting as long as three minutes.

- For pre-engineered systems *identical to the FM test basis of the listing*, the three-minute off cycle might be appropriate.
- Where conditions differ from the listing basis, such as larger volume spaces, the potential for gas release, or the proximity to heat-sensitive control equipment, the three-minute off cycle is unacceptable.

We must understand how the water mist system will perform in a particular application. When selecting the minimum duration of discharge for water mist, system designers must consider such elements as the time required for turbine coast-down, emergency shut down and response.

In the ever-growing number of FM and UL listings for water mist systems, field applications inevitably vary from the listing. Water mist system designers must judge when they can safely extrapolate design criteria from the listing. For that reason, the vendor, designer, owner, and authority having jurisdiction must discuss the design of water mist for fire protection. Owners and authorities should require a technical review as assurance that extrapolation of test data is technically acceptable and that the system may be reasonably expected to provide the desired protection.

EMERGENCY RESPONSE PLANS

Emergency response planning has even greater importance today than in years previous.

Encroachment has reduced the safety factor for response. The time allotted to conduct an emergency shut down has created even greater pressure on the operator responsible to do so. If s/he errs by not shutting down when appropriate, the public is endangered. If s/he errs by shutting down when inappropriate, s/he creates an economic burden on the employer and company shareholders. To compensate for this situation, companies have turned again to basics, supplemented by modern technology.

To gain a better understanding of the limits of operations and the incidents that may occur, plant workers apply process hazard analysis techniques, such as hazard and operability (HAZOP) studies and failure mode and effects analysis reports. Modeling helps provide an understanding of the potential consequences and the time available to respond to a release.

In one community, the petrochemical industry funded a sophisticated, integrated, neighborhood warning system to alert plant personnel, emergency responders (fire department, police department, environmental health organizations, government agencies, etc.), and nearby citizens. Designed to provide information to all concerned about the incident and the proper response to it, the system involves sirens, telephone call down systems, public radio and television, highway electronic signage, radios in hospitals and similar public areas, and even car radios.

To improve the efficiency and effectiveness of emergency response, some companies set up exercises, based on possible incidents. These simulations are beneficial and include *what if* drills, tabletop exercises, limited full-scale drills, and full-scale drills involving the community and mutual aid organizations.

Almost axiomatic in the analysis of response to actual emergencies is the primary criticism about difficulties resulting from a lack of communication during an emergency. To improve communications, many companies have established well-developed command centers where company management and key personnel gather. These rooms are equipped with everything needed to assist the Incident Commanders when responding to an incident. The companies also establish a process to review, test, and update all tools and information in the room routinely. Some of the materials and equipment include:

- A well thought out, up-to-date, and documented emergency response plan, identifying responsibilities, personnel, and probable steps during a disaster
- Televisions and radios to monitor public broadcasts
- Computer systems and backups
- Facility site plans
- Models of releases
- Process piping and instrument diagrams
- Process flow diagrams
- Fire water system drawings
- Emergency telephones
- Mobile phones
- Multiple two-way radio networks

Successful implementation of the plan is a function of training and drills, which must include all stakeholders who may become involved in the response.

In the best case, companies integrate response plans into multi-hazard plans and corporate business continuity plans. In some cases, companies also establish and maintain alternate remote control centers.

CLASS B FIREFIGHTING FOAM

The 3M Company recently reduced the arsenal of firefighting weapons by deciding to stop manufacturing Class B firefighting foam, including Light Water™ aqueous film-forming foams (AFFF) and alcohol type concentrate (ATC). They based their decision on environmental concerns about biodegradation products from 3M's fluorochemical surfactants, produced by the electrochemical fluorination manufacturing process.

The biodegradation product (perfluorooctane sulfanate, or PFOS) from 3M's fluorochemical surfactants **does not** meet U.S. Environmental Protection Agency environmental objectives = relating to PBT: **p**ersistence (does not dissipate in the environment), **b**ioaccumulation (builds up in living tissue) and **t**oxicity (has a negative affect on organisms). As a result of data about issues with PBT and potential future regulations/restrictions, 3M decided to stop manufacturing foam.

Other suppliers of foam derive fluorochemical surfactants from a different manufacturing process, telomerization. Concerned that telomer-based products may also be PBTs. The U.S. EPA is, however, currently performing a hazard assessment of telomer-based chemicals and their biodegradable products.

Those involved with flammable liquid fire protection should continue to be well informed about the environmental status and any attempt to limit the availability of foam. Foam is a major tool in the firefighting arsenal for hydrocarbon fires and potential future restrictions could have significant impact on fire protection.

SUMMARY

Over the years, changes in the flammable liquids and petrochemical industries have affected the approach to fire protection. Reductions in manpower, budget, and experience levels and the encroachment of society on hydrocarbon facilities changed protection.

Flammable liquids and petrochemical industries are placing greater emphasis on a systems approach to fire safety, MPH, training tools and emphasis, performance based designs, water mist fire protection systems, emergency response plans, new concerns about firefighting foam, and environmental considerations in firefighting.

We expect computers to facilitate decision-making during an emergency and to minimize the effect of an incident. Electronic tools also manage changes to our designs, operational controls, training of personnel, and safe shut down of facilities under emergency conditions.

We have come far in the past few years and must be ready to continue our contributions, awareness, and acceptance of change and improvements in the protection flammable liquids.

Jack Woycheese, P.E., FSFPE, a senior fire protection engineer with Hughes Associates, Inc., has experience in the hydrocarbon and petrochemical industries in Alaska, Canada, Dubai, Indonesia, Saudi Arabia, and the United States. He also represents Hughes as vice president of international business development.

Mr. Woycheese holds a BSc in Fire Protection Engineering from Illinois Institute of Technology and a Masters in Business Administration from Northwestern University. He is a former president of SFPE, chairs the NFPA 30 (Flammable and Combustible Liquids Code) Technical Committee on Operations, and is a principal member of NFPA 30 Technical Correlating Committee.

Mr. Woycheese is a Registered Professional Engineer in California, Illinois, and the Republic of Korea.

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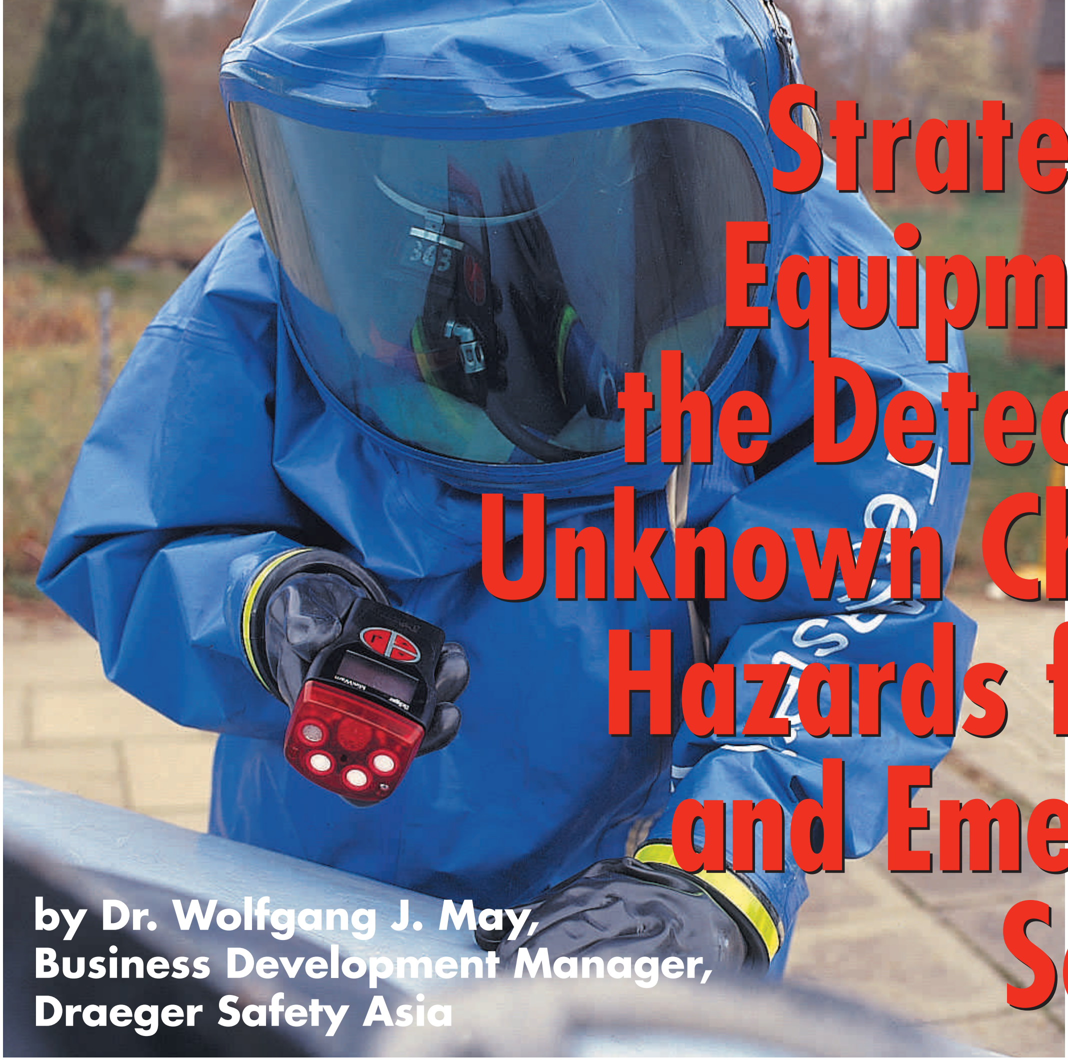

Strategy and Equipment for the Detection of Unknown Chemical Hazards for Fire and Emergency Services

by Dr. Wolfgang J. May,
Business Development Manager,
Draeger Safety Asia

IN MANY CASES first responders have to deal with unknown chemicals, which can be either flammable gases, toxic industrial chemicals (TIC's) or even chemical warfare agents. In emergency situations there is only limited time to determine which chemicals are present, otherwise even more important actions would be neglected. The necessary equipment should not be too bulky or complicated in use.

Based on practical experience in the field a combination of direct-reading detector tubes and portable electronic instruments have proven to be the most suitable method to allow for fast and reliable detection and measurement of both toxic industrial chemicals and chemical warfare agents. User-friendly evaluation charts can guide the user to properly evaluate the different colour stains in the detector tubes. Comprehensive information in the display of a portable instrument gives a clear picture about the kind of chemicals being present and their concentrations in conjunction with audible and visual alarms in case critical levels have been exceeded.

THE STRATEGIC APPROACH

In the general industry we find about 5,000 to 6,000 different chemicals, which are in daily use, some in small, some in larger quantities. In the event of a chemical accident, such as a spill, an explosion, or a fire we should be prepared to determine within 15 to 20 minutes which chemicals are present. As there is no single instrument available, which could detect all 5,000 chemicals in one unit (it is impossible because of the different types of chemical behaviour) we need to take a strategic approach. Nobody is willing to carry a large quantity of detection devices in the field to be prepared for everything. Even disregarding budgetary considerations it would still be an issue of time, and this is the critical limitation.

There are three essentials to follow: a) the more we know about which chemicals could be present, the better we can be prepared to select the proper detection equipment (and of course also the protective equipment), b) if we don't know what's present in the case of unknown chemicals or warfare agents we need a strategic selection of detectors based on the statistical evaluation of chemical accidents and which limits the quantity of necessary devices drastically, and c) further to the instrument selection we need regular training so that each and every individual first responder feels comfortable with his equipment and knows very well how to use it and how to evaluate the results in a limited period of time.

THE TUBES APPROACH

Direct reading detector tubes have the big advantage of allowing for the measurement of a large variety of different chemicals. This method utilizes a length-of-stain type discolouration of the reactive chemicals inside the tubes to determine the concentration. Based on printed scale marks or a full scale in ppm the concentration can be evaluated directly and no calibration is required by the user. Ambient air is drawn through an opened tube by means of a

Simultaneous Test Kit Detector Tubes

manually operated bellows pump and no battery is necessary. This means that the tubes can be used at any time without preparation.

In order to save valuable time it is usual to combine 5 tubes in a sampling manifold, which can then be used for a simultaneous measurement, thus the measurement time is reduced by the factor of 5 and we observe five results in the time of one.

There are currently three different simultaneous test kits available to measure the following toxic industrial chemicals:

Kit 1:
1. Acid Gases (Hydrochloric Acid, Nitric Acid, etc.)
2. Hydrocyanic Acid
3. Carbon Monoxide
4. Basic Gases (Ammonia, Butylamine, etc.)
5. Nitrous Gases (NO + NO_2)

Kit 2:
1. Sulphur Dioxide
2. Chlorine
3. Hydrogen Sulfide
4. Carbon Dioxide
5. Phosgene

Kit 3:
1. Ketones (Acetone, Methyl Ethyl Ketone, etc.)
2. Aromatics (Benzene, Toluene, etc.)
3. Alcohols (Methanol, Ethanol, etc.)
4. Aliphatic Hydrocarbons (Hexane, Octane, etc.)
5. Chlorinated Hydrocarbons (Perchloroethylene, Trichloroethylene, etc.)

As we can see with the above mentioned simultaneous test kits we can measure TIC's which are either used as bulk chemicals (e.g. HCl, VC, etc.), which are released during spills (e.g. Hydrocarbons), or those which are formed as decomposition products during fires (e.g. HCN from Plexiglas, HCl from PVC, phosgene from chlorinated hydrocarbons, etc.). In the event that the group of chemicals similar to the representative chemicals in kit 3 are detected it is usual to precalibrate the tubes with the most toxic chemical so that the measurement is always on the safe side.

THE PORTABLE INSTRUMENT APPROACH

Traditional Portable Gas Detection Instruments utilize a combination of sensor technologies (electrochemical sensors, catalytic sensors, infra red sensors) and provide a continuous real-time reading of the gas concentration. They may be equipped with a series of advanced features (such as datalogging) and are important devices for the Fire and Emergency Services. However it must be remembered that the number of gases that can be measured is limited (A typical device can measure 4 or 5 gas hazards simultaneously – for example Oxygen, Explosive Gases, Hydrogen Sulphide, Carbon Monoxide) and furthermore the unit is only of limited use in detection of unknown substances. Regardless these units still make up an important part of the arsenal of the first responder and are particularly useful for 1) personal monitoring (to determine the oxygen level in the breathing zone 2) determination of whether there is a risk of explosion and 3) Confined Space Accidents.

Electronic Portable Gas Monitor

CDS Kit

With the combination of simultaneous test kits plus one electronic portable instrument to measure oxygen, combustible gases and certain toxic gases the responder can be prepared to detect 85 % of unknown chemicals in the field.

What about the remaining 15%? Well, there is one particular group of chemicals being left out so far, which are chemical warfare agents.

Typically when considering chemical warfare agents we talk about the following substances:

Nerve Agents: **Sarin, Tabun, Soman, VX**

Blister Agents: **Mustard Gas, Lewisite**

Blood Agents: **Hydrogen Cyanide, Cyanogen Chloride**

Lung Agents: **Phosgene, Chlorine**

For the fast detection of CWA's, CDS-kits can be used – similar to the simultaneous test kits for TIC's where each sampling manifold comprises 5 different direct reading detector tubes, and 2 kits can cover all groups of chemical warfare agents. As a convenience for the user the tubes are normally stored in a rugged transportation case which can then be taken anywhere in the field.

> *Traditional Portable Gas Detection Instruments utilize a combination of sensor technologies (electrochemical sensors, catalytic sensors, infra red sensors) and provide a continuous real-time reading of the gas concentration.*

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CDS Ion Mobility Spectrometer

The case also contains evaluation charts to determine the concentration of individual warfare agents conveniently.

The CDS-kits allow for a fast detection of chemical warfare agents using the same bellows pump as mentioned for the simultaneous test kits. Again, no calibration or charging of batteries is required.

ION MOBILITY SPECTROMETERS FOR DETECTING CHEMICAL WARFARE AGENTS

With all the advantages of direct reading detector tubes in mind, there are still two technical limitations. 1) We have to evaluate the colour stain ourselves and 2) There is no automatic alarm function. This has led to considerable research and investment to develop an electronic device to detect chemical warfare agents with the fastest possible response time as well as sufficient sensitivity and selectivity.

The latest type of unit available on the market is the Portable Ion Mobility Spectrometer. Such a device is hand-held (less than 1 kg) and able to operate for more than 10 hours in the field. An IMS will have both audible and visual alarms plus additional features such as trend indications or substance and concentration specific icons, which appear in the display and give valuable information about the measured chemicals.

An IMS functions by drawing the ambient air into the unit via a built-in pump (airflow of 1 l/min) and passing it through the Ion Mobility Cell. The polarity in the multi-channel IMS-sensor changes quickly 10 times every second, so that we can determine both positive and negative ions at the same time. The signal generated is amplified and displayed on the screen in ‘real time’. Detection limits for such devices may be <0.01 mg/m^3 for nerve agents including VX, <0.1 mg/m^3 for lewisite, and <0.5 mg/m^3 for mustard gases, typical response times are in the order of 2 seconds for most compounds. Based on the evaluation algorithm differentiation between different groups of CWA’s is given, in some cases we can even differentiate within one group of agents.

The IMS will normally have a built-in datalogger which stores all measurement results, times, and substances and after downloading to a computer the whole exposure period can be evaluated.

CONCLUSION

The combination of direct-reading detector tubes and portable electronic instruments allows for fast detection of unknown chemicals, toxic industrial chemicals as well as chemical warfare agents. This makes it vital equipment for first responders. Third party validations have proven sensitivities, response times, and specificities as well as the practicability in the field with limited training required. Modern IMS devices represent a major step forward to have a real portable monitor to measure chemical warfare agents.

> *The combination of direct-reading detector tubes and portable electronic instruments allows for fast detection of unknown chemicals, toxic industrial chemicals as well as chemical warfare agents.*

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High Rise Office Building Fire Protection

by Fang Li
Rolf Jensen & Associates

HIGH RISE BUILDINGS have been one of the most prominent symbols of economic growth for nearly a century. Yet, in the aftermath of the tragedies of September 11, "signature" high rise buildings have become the focus of much debate. Do we still want to build such large buildings? Can we adequately protect these buildings and their occupants? Based on the vast number of proposed high rise projects around the world, especially in Asia, it is clear that the desire to build such monuments is still there. In order for us to protect these buildings and their occupants, fire protection engineers will be facing an increasing challenge to demonstrate that the designs can meet the demands of their inherent fire and life safety risks.

With the fire and life safety concerns these structures represent, most modern building codes around the world have specific prescriptive requirements to address various aspects of their design. These prescriptive requirements address passive fire protection systems (fire resistance ratings of the structural elements), active fire protection systems (fire sprinkler and smoke control systems), communication systems (fire detection and alarm), and egress systems (stairs and refuge areas). The table (page 22) presents a comparison of representative prescriptive code requirements for high rise office buildings in different countries.

Although these codes are similar in many requirements, significant differences can be found. One such difference is in compartment size, where the Chinese code is very restrictive while the US codes have no limitation. Reasons for such differences include a country's economic condition, relative emphasis on active versus passive fire protection, climate, maintenance, and historical usage. China's reliance on fire and smoke compartmentation, coupled with natural smoke control, can be attributed to the considerations of cost effectiveness and reliability. But, such prescriptive approaches can often create problems for high rise buildings with mixed used occupancies, large assembly areas, or unique atrium designs. Relying on

> *Although these codes are similar in many requirements, significant differences can be found. One such difference is in compartment size, where the Chinese code is very restrictive while the US codes have no limitation.*

High Rise Office Building Fire Protection

compartmentation can result in dividing the building into small cubes that limit architectural expression and effective functioning of the building.

The codes today are undergoing a major evolution to address the ability of providing flexibility in the design and use of the building together with cost-effective fire and life safety. Rather than only allow for the application of the restrictive prescriptive code requirements, codes are beginning to accept performance-based design approaches as an equivalency. The use of performance-based design can achieve a level of fire safety equal or better than the prescriptive code while providing the local authority having jurisdiction with an engineered basis for acceptance of the approach. Performance-based design provides the opportunity to overcome the differences between codes of various countries, allows designers to create engineered solutions, and results in cost effective global fire safety.

The Petronas Towers, located in Kuala Lampur, Malaysia, offer a good example of the benefits of performance-based fire safety design. With heights of approximately 1,480 feet, the towers are the two tallest buildings in the world and are the home for the Malaysian government's gas and oil company as well as other multinational corporations that lease space. Rolf Jensen & Associates provided the code consulting and the fire alarm and emergency communications system design for this mixed-use project. A unique egress solution using the elevators and skybridges was developed, where the 750-ton skybridge connecting the towers in the middle serves as an emergency egress route between the towers and the upper and lower floors. The lobbies at each end of the pedestrian bridge were designed as fire compartments, each having its own separate HVAC systems. In order to limit fire and smoke spread, the connecting bridge area was compartmented by use of fire resistance rated assemblies with fire stopping systems. (Several tragic fires have occurred in other parts of the world where a similar approach was followed, but did not include a suitable fire stopping system.) A fire alarm and emergency communications system designed in accordance with the NFPA 72 – "National Fire Alarm" standard together with redundant command centers was provided. The fire suppression system was designed to comply with the NFPA 13 – "Automatic Sprinkler Systems" standard. The combined use of local and international codes on a performance-based approach provided the designer with a more flexible design without sacrificing the level of fire safety.

Each country's codes have their own approach, logic, and advantages. For example, the Chinese code for high rise office buildings over 100 meters in height. It requires an area of refuge every 15 floors with the area providing a minimum size of 0.2m^2/person. In the Chinese code there is no specific guideline to calculate the occupancy loads, so designers usually use other international codes and standards as the reference. For a 20 story building having 24,000 ft^2 per floor with an occupancy load of 100 ftgross area/person, we would have 240 people per floor. Using the code complying stairwell system,

	Hong Kong	China	UK	US IBC	NFPA 101
Definition of high rise	30m or more in height	Over 24m in height	–	23m or more in height	Over 23m in height
Fire resistance	Decided by building construction function	Decided by building construction assembly	Decided by building construction function	Decided by building construction assembly	Not addressed
Maximum fire compartment size	28,000m^3 (above ground level) 7,000m^3 (below ground level)	1,000m^2	No limit	No limit	No limit
Minimum Number of exits	2	2	2	2	2
Maximum Travel distance	36m	40m	45m	91m	91m
Area of refuge floors	Maximum every 20 floors	Maximum every 15 floors	No requirement	No requirement	No requirement
Number and location of fire elevators	Maximum 60m from most remote area to fire elevator	Decided by floor area, no location requirement	Decided by floor area	No requirement	No requirement
Emergency operation of HVAC system	Shut down	Shut down	Shut down	Shut down	Not addressed

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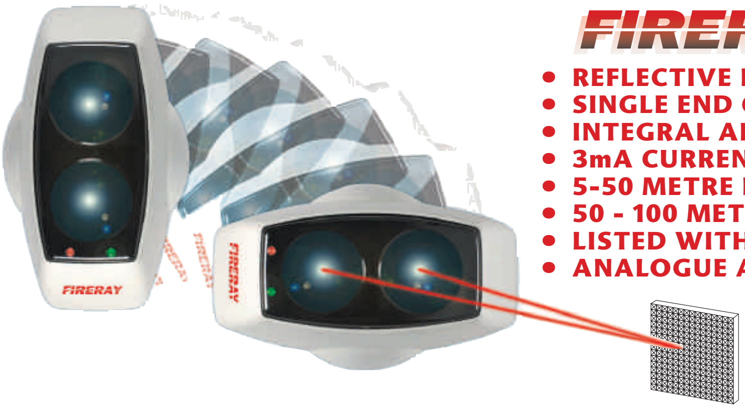

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Jin Mao building in Shanghai, PR China. *Picture courtesy of Rolf Jensen & Associates*

timed egress calculations predict that it will take about 51 minutes to evacuate the building. If instead of total evacuation, one moves people to a refuge floor, this time can be significantly reduced (in this case to less than 25 minutes). In China, the total height of 15 floors would be around 50 meters which is just within the range of the fire truck rescue capability in China, giving the options for the fire department to rescue the people in the first area of refuge to egress by both fire truck ladder and stairwell. In the US codes, there is no such requirement for refuge areas. Egress design is achieved by the egress zone, which is typically defined as the fire floor, the level below and the level above, which needed to be evacuated simultaneously. All the other floors keep the concept of "defend in place" which in most situations is believed to be the correct approach. Since September 11, however, this concept is being discussed because of the implications that human behavior may cause the occupants to now evacuate all floors above the fire floor.

> *In its efforts to reduce barriers to international trade, the World Trade Organization (WTO) encourages the concept of international codes and standards. WTO compliant international standards development organizations include ISO, IEC and NFPA.*

In its efforts to reduce barriers to international trade, the World Trade Organization (WTO) encourages the concept of international codes and standards. WTO compliant international standards development organizations include ISO, IEC and NFPA. Each of these organizations is including performance-based design criteria in their documents.

In support of these code development efforts, performance-based design approaches are being closely studied. There are three major tasks associated with this study:

- behavior of the building construction during fire exposure
- computer modeling to predict the smoke spread
- computer modeling to predict automatic suppression system actuation and fire control

Computational Fluid Dynamics (CFD) modeling has previously been used in high rise buildings for analysis of the effects of wind on the structure. CFD modeling is now also being used for the study of smoke movement in the building. The traditional method to predict the construction behavior by the small and large scale tests are not cost-effective and, as a result, much effort is being place of this modeling approach. The model gives us the capability, with real time visualization output produced from the fire models, to design the emergency smoke control system and evaluate the associated evacuation options. The egress model,

Jin Mao building in Shanghai, PR China.
Picture courtesy of Rolf Jensen & Associates

Pathfinder, which has been developed by the engineers at Rolf Jensen & Associates is a valuable tool in conducting, verifying and demonstrating the egress analysis.

Even though the loss from September 11 may bring questions and concerns on the future for high rise buildings, there is no question that for some countries such as China, with the high density of population and the economic boom, high rise buildings will still be dominant in major cities. The collapse of the WTC bring us to the question of high-rise office building sprinkler systems and can they help maintain structural integrity in such an incident? The critical failure temperature for steel element is about 500-600ºC without any fire retarding treatment, and in most cases for a conventional fire, the sprinkler system would have been sufficient to control the fire size and allow for occupant egress. For office buildings, its fire load is generally defined as 2,000 btu/ft. The fuel load presented by the jet fuel in WTC was considerably greater than what the sprinklers could have been expected to control contributing to the fire growth and its great impact for the whole building construction integrity. Most people agree that it is impractical to attempt to design a sprinkler system for a building to withstand the impact from a fully-fueled wide body jet. However, with an integrated performance-based approach to fire safety, performance objectives can be developed to meet the exposures the building may be expected to face.

An integrated fire protection system for a building should include the fire resistance rating for the assemblies, the fire stop system in curtain walls and rated assembly penetrations, the fire alarm system along with the emergency voice system, the fire suppression system, and egress systems. All fire safety systems need to be monitored at a fire command center by qualified personnel. A properly managed maintenance program and an emergency evacuation training plan are also necessary. For a good fire protection system, survivability and reliability should be inherent in the design.

We have always learned from fire disasters, such as the New York City Triangle Shirtwaist fire early in the 20th century which led to the creation of their first Bureau of Fire Prevention and the enforcement of fire safety codes for compulsory fire drills and the installation of sprinklers in factories. The MGM Hotel fire in Las Vegas demonstrated the importance of sprinkler systems together with an integrated fire alarm and emergency communications systems working with the emergency smoke control systems. The tragic events of September 11 should be another reason for all of us to think deeply on how to make our buildings stronger and our world safer.

Fang Li is a Consultant with Rolf Jensen & Associates in their Framingham, Massachusetts, USA office. She has a Masters Degree in Fire Protection Engineering from Worcester Polytechnic Institute (USA) and a Bachelors Degree in Chemical Engineering from Jiao Tong University (X'ian, China)

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Positive Pressure Ventilation Fans

The use of Positive Pressure Ventilation (PPV) fans as a fire fighting tool was first pioneered in the USA but is now in increasing use throughout Europe and across the world. The object of a PPV fan is to provide effective ventilation that will remove heat, smoke and toxic gases away from fire fighting personnel during fire suppression operations. In a typical PPV application the fan is placed about 1.2m to 2.4m away from the external doorway (assuming the doorway is of a standard size, 0.9m wide by 2.0m high) of a burning structure. Straight away air pressure builds inside the structure. A ventilation opening, usually a rear door or window, allows the static air inside to escape, and very quickly the smoke and gasses generated by the fire are replaced by cooler, fresher air.

The main aims of the ventilation process are to –

- Reduce or eliminate the products of combustion
- Reduce the interior temperature within a contaminated area
- Improve visibility for occupants and fire fighting personnel
- Increase safety for fire fighting personnel
- Reduce fire loss

Operational Considerations

The effective use of a PPV fan requires the following procedures to be considered –

Entrance Opening

The PPV fan must be positioned so the cone of air it produces just covers the entrance opening. If the fan is too close to the opening, gases can escape from the unsealed edges of the doorway and immediately be reintroduced into the pressurised area of the structure.

If the fan is too far from the opening, pressurised air will strike the area around the entrance, reducing the amount of air being forced inside the structure. Optimum placement is a combination the opening size, the PPV fan size and the distance between the fan and the entrance opening.

Model 27T10 – a 27 inch diameter fan, providing up to 15,805 CFM (26,857CMH) from a 10HP Tecumseh engine

Model 18H5 petrol engine driven PPV fan. The Honda engine produces 6,500 CFM (10,803 CHM) at 5.4HP, 3600rpm, from a 18 inch diameter fan.

Small PPV fans need to be moved back from the entrance while larger models should be placed closer to the entrance. This is due to the size of the "cone" of air that the fan produces. The effectiveness of the fan can be enhanced by tilting the unit back at an angle of about 25 degrees.

Exhaust Opening

Positive pressure ventilation is at its most efficient when the exhaust opening (window, door etc..) is between ¾ to 1¾ the size of the entrance opening. This variance is due to the power and number of fans used. A small fan, powered by a 2 HP engine is most efficient when utilised with exhaust openings that are ¾ to slightly larger than the entrance opening. A larger fan with a more powerful 3 to 5 HP engine may require an exhaust opening that is between 1 and 1½ the size of the entrance opening. Optimum fan efficiency is obtained by a combination of training and practical experience.

Types of PPV Fans

PPV fans are available in a range of sizes (fan diameters) and power sources. The main power units are water turbine, electric or petrol engine driven.

When selecting a PPV fan the following factors should be addressed –

Performance

This is a measure of the amount of air that is moved by a fan, usually rated in cubic feet per minute (CFM) or cubic metres per hour (CMH). There are two USA-based organisations that have established PPV fan performance standards – Air Movement and Control association (AMCA) and the National Electric Manufacturers Association (NEMA). The AMCA measures the volume of air displaced at the propeller and the NEMA measures the volume of air displaced downstream from the propeller. These two methods result in different CFM ratings for the same fan, so it is important to ensure that performance rating methods are consistent when comparing fans.

Size

The main factors to consider when assessing the appropriate size are CFM/CMH capability and dimensions. PPV fan sizes are typically supplied in 18, 21, 24, 27 or 30 inch fan diameters. A fan less than 18 inch diameter does not offer a good CFM rating due to small size and limited power unit.

An 18 inch fan, such as the Hale 18H5 model (powered by a 5.5HP engine), will provide satisfactory results for an area up to 2,000 sq feet. If a better and more versatile performance is required then the 21 inch fan is becoming increasingly popular. These are not much bigger than the 18 inch but offer a performance close to that of a 24 inch fan.

So the middle range of fans – 21 and 24 inch offer –

- Good CFM/CMH rating
- Large cone of pressurised air for covering entrance openings
- Optimum size for deploying and storing

The larger 27 and 30 inch fans offer higher power units and CFM/CMH ratings and are more versatile in the size of structures that can be engaged.

In addition to size and CFM/CMH ratings consideration must be given to the overall size and weight of the fan and the available space in the fire appliance to store it.

Power Source

Power sources can be electric, water turbine or petrol engine driven. Generally, the best power performances can be obtained from the water turbine and petrol engine models. Electric powered fans tend to be smaller models with lower CFM/CMH ratings.

Today, more petrol engine driven models are available with larger 5 or 10HP engines, such as the Hale 18H5, 21H5 and 24H5 using a 5.5HP Honda engine and the 27T10 using a 10HP Tecumseh engine. These units provide a powerful performance in a compact and robust frame. The water turbine powered models, such as the Hale 21W10 or 30W22 models, can also produce a substantial performance that is equivalent or better than a similar sized petrol engine unit. Most models are fitted with tilting mechanism, lightweight frame and wheels for easy manoeuvrability. For the water turbine powered models a range of different hose connections are available to suit local standards.

One of the main advantages of the petrol engine models is being self-contained and independent of an external power source. The water turbine powered models have the advantage of being lighter in weight and simpler to run and maintain. Each type of model will have particular advantages in different applications.

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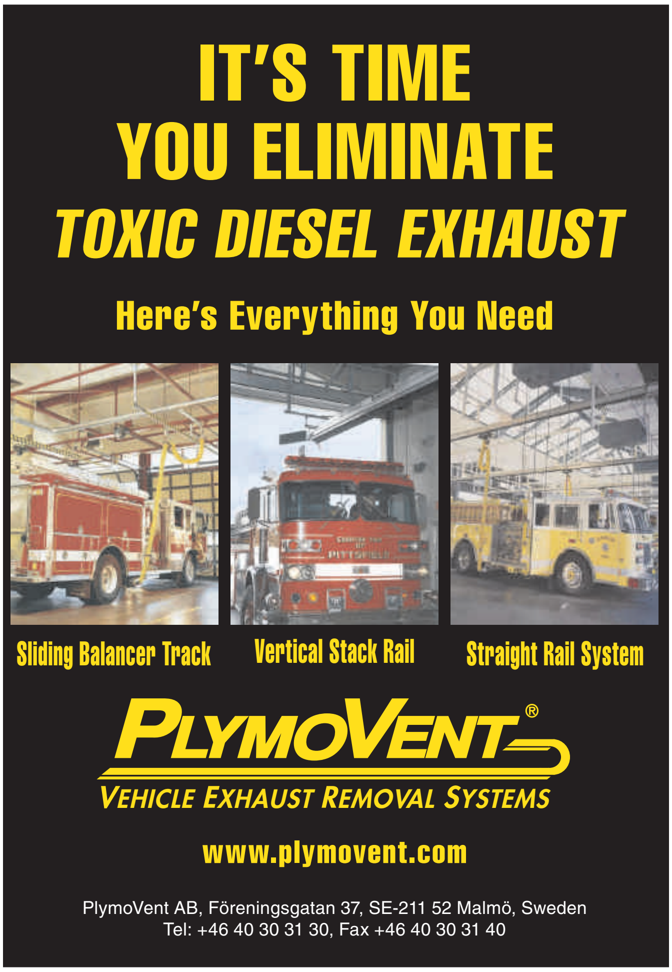

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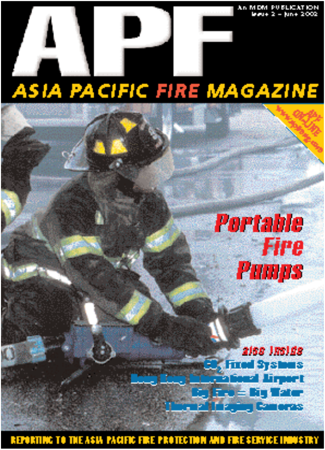
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SPREADERS
MARKET GUIDE

AMKUS RESCUE TOOLS

Brand Name	**AMKUS**	**AMKUS**
Model	**AMK-30CX**	**AMK-28**
Origin	USA	USA
Max. Working Pressure (bar)	724 bar	724 bar
Spreading Distance (mm)	813 mm	711 mm
Max. Spreading Force (kN/t)	75.4 kN/t	237.0 kN/t
Min. Spreading Force (kN/t)*	41.9 kN/t	38.5 kN/t
Pulling Force (kN/t)	63.7 kN/t	67.0 kN/t
Squeezing Force (kN/t)	60.2 kN/t	53.6 kN/t
Weight ready for use (kg)	21.5 kg	23.6 kg
Dimensions (mm)	765x305x208	668x305x229
Warranty	2 years	2 years
***in accordance with prEN13204 and/or NFPA 1936 (25mm from tips, over full spreading distance (kN/t)**		

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HOLMATRO RESCUE EQUIPMENT

Manufacturer	**HOLMATRO RESCUE EQUIPMENT**	**HOLMATRO RESCUE EQUIPMENT**	**HOLMATRO RESCUE EQUIPMENT**	**HOLMATRO RESCUE EQUIPMENT**
Model	**SP 3240+**	**SP 3260+**	**SP 3280+**	**PW 3624+**
Origin	The Netherlands	The Netherlands	The Netherlands	The Netherlands
Max. Working Pressure (bar)	720 bar	720 bar	720 bar	720 bar
Spreading Distance (mm)	686 mm	833 mm	675 mm	**
Max. Spreading Force (kN/t)	157/16	196/20	258/26.3	235.4/24
Min. Spreading Force (kN/t)*	43/4.4	60/6.1	86.5/8.8	N.A.
Pulling Force (kN/t)	83.4/8.5	107/10.9	159/16.2	N.A.
Squeezing Force (kN/t)	62.5/6.4	82/8.4	188/19.2	N.A.
Weight ready for use (kg)	18.6 kg	24.6 kg	27.6 kg	10.6 kg
Dimensions (mm)	750 x 296 x 206 mm	863 x 320 x 230 mm	780 x 320 x 230 mm	711 x 230 x 203 mm
Warranty	18 months	18 months	18 months	18 months
				**The spreading distance is 50mm. The tool however is designed for a different spreading application: with an insertion opening of only 6 mm, it is designed to create an initial opening where hardly any space is available.
***in accordance with prEN13204 and/or NFPA 1936 (25mm from tips, over full spreading distance (kN/t)**				

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SPREADERS
MARKET GUIDE

	LUKAS HYDRAULIK GMBH & CO.	
Brand Name	**LUKAS**	**LUKAS**
Model	**LSP 40 EN**	**LSP 60 EN**
Origin	Germany	Germany
Max. Working Pressure (bar)	630 bar	630 bar
Spreading Distance (mm)	720 mm	800 mm
Max. Spreading Force (kN/t)	230 kN	230 kN
Min. Spreading Force (kN/t)*	42.7 kN	62.4 kN
Pulling Force (kN/t)	54.2 kN	70.4 kN
Squeezing Force (kN/t)	112.9 kN*	70.4 kN*
Weight ready for use (kg)	19.6 kg	25 kg
Dimensions (mm)	790 x 299 x 180	880 x 378 x 212
Warranty	2 years	2 years
	*with squeezing attachment	*at the tips
***in accordance with prEN13204 and/or NFPA 1936 (25mm from tips, over full spreading distance (kN/t)**		

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Website: www.lukas.de

	ZUMRO B.V.			
Brand Name	**ZUMRO**	**ZUMRO**	**ZUMRO**	**ZUMRO**
Model	**RESQ 40**	**RESQ 40 32’**	**RESQ 50**	**RESQ 80**
Origin	The Netherlands	The Netherlands	The Netherlands	The Netherlands
Max. Working Pressure (bar)	350-630-720 bar	350-630-720 bar	350-630-720 bar	350-630-720 bar
Spreading Distance (mm)	704 mm	822 mm	804 mm	704 mm
Max. Spreading Force (kN/t)	187.3 kN 19.1 ton	187.3 kN 19.1 ton	123.8 kN 12.6 ton	1,019.10 kN 103.9 ton
Min. Spreading Force (kN/t)*	39.2 kN 4.0 ton	33.1 kN 3.4 ton	55.9 kN 5.7 ton	98.2 kN 10.0 ton
Pulling Force (kN/t)	65.9 kN 6.7 ton		83.3 kN 8.5 ton	
Squeezing Force (kN/t)	59.4 kN 6.1 ton	59.4 kN 6.1 ton	61.0 kN 6.2 ton	111.4 kN 11.4 ton
Weight ready for use (kg)	20.5 kg	21.5 kg	25 kg	34.8 kg
	620x310 220 mm	688x310x220 mm	735x365x250 mm	570x378x244 mm
	1 year	1 year	1 year	1 year
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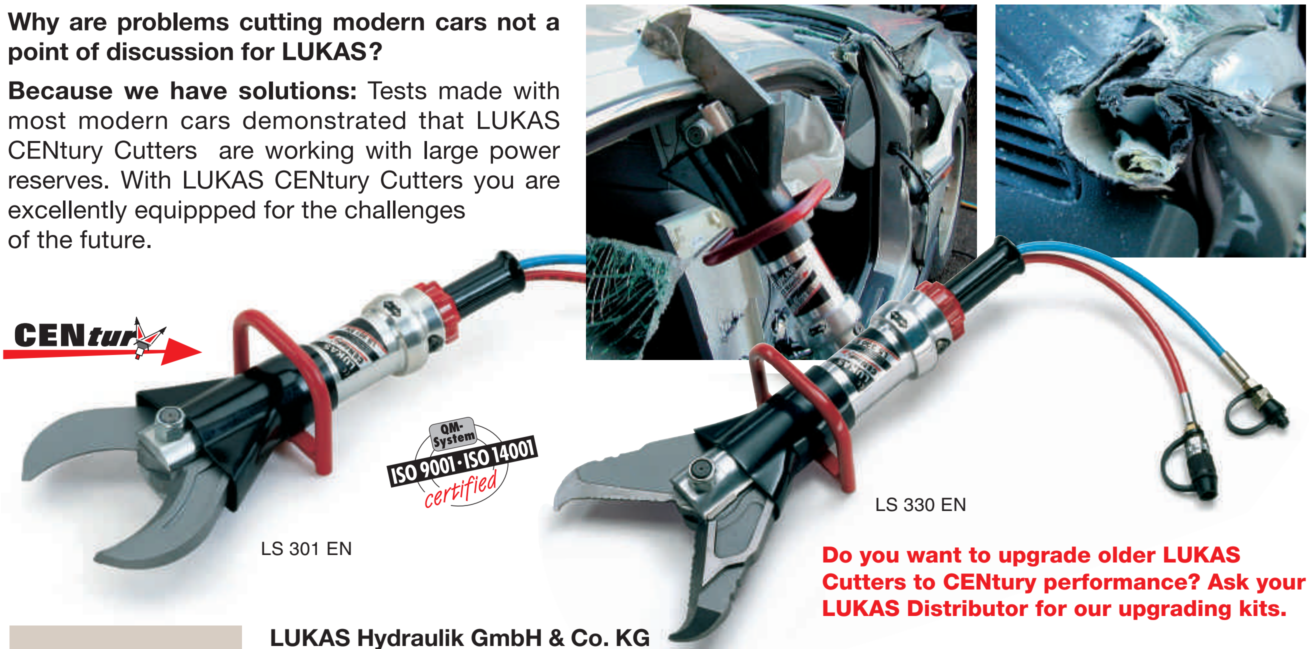

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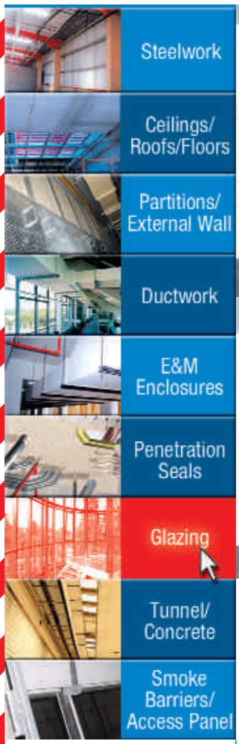

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Deluge Systems

The Innovative Design Approach

High capacity nozzles discharging

by Doug Pickersgill
Principal
Fire & Safety Systems (FSS)

HAVING ENGINEERED and overseen the design and installation of numerous deluge systems over the past 40 years, and a long time exponent of the use of fire fighting foams as an additive to allow the protection of difficult fire protection hazards, I have taken this opportunity to present an actual case study. This commentary reflects a practical application utilising the latest technology available to break the shackles of traditional thinking. This innovative approach by my company, Fire & Safety Systems (FSS) provide the customer with a cost effective, fit for purpose, low maintenance system.

Deluge systems are possibly the oldest form of fixed fire protection system developed. Notwithstanding the term "DELUGE", is possibly the most misused word in the fire protection industry.

- Clients often ask, *"Do we require a deluge system under the substation to protect the cable racks?"* when they are really asking, "*Do we require a wet pipe sprinkler system to protect the cable racks?"*
- Fire system designers use the term "*water deluge system"* when they are endeavouring to explain to the vendor that they require a **water spray** *deluge system.*

Deluge systems represent a methodology for the application of various fire-fighting agents to a conflagration eg:

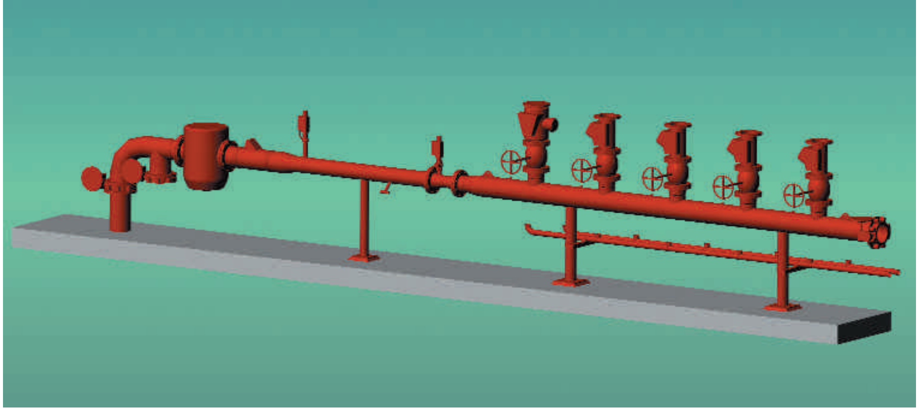
- Water (sprinklers, water spray, water mist, wall drenching, etc)
- Foam (low, medium or high expansion, sprinklers, sprays, monitors, etc)
- Gas (CO_2, IG-541, FM-200, etc)
- Powder (Dry chemical, etc)

NFPA-16 Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems, Chapter 1, Clause 1.3 Definitions clarifies the terminology and its relativity to its application methodology:

Foam-Water Deluge System. A foam-water sprinkler system employing automatic sprinklers or nozzles that are attached to a piping system that is connected to a water supply through a valve that is opened by the operation of detection system, which is installed in the same area as the discharge devices. When this valve fully opens, water flows into the discharge piping system and discharge from all discharge devices attached thereto.

This example of year 2000 technology, utilising deluge system logic, was applied by FSS as part of a major fire systems upgrade involving the replacement of eight existing transformers and associated water spray deluge systems with 50% larger rectification capacity units at one of the worlds largest aluminium smelters in Australia.

The eight existing transformers are located in two groups of four at the end of each Cell Line. Each transformer was protected by automatic water spray deluge system activated by wet pipe sprinkler head detection. The four deluge valves were located on a manifold at the end of each group of bays and connected to the plant raw/fire water reticulation system.



3D model – deluge valve header and reticulation system

The degree of difficulty presented to FSS to resolve involved replacing the existing fire protection systems on a one-by-one basis with the adjacent transformers live and operating with no plant down time. This called for the new systems to be installed in parallel with the existing systems to ensure protection to the hazard prior to the removal of the existing transformers and their replacement with new units.

Constraints presented to FSS, that would have an influence on the design proposed, were:

- Compliance with existing local and international codes of practice – NFPA 15 or 16 and the utilisation of existing water supplies to protect the 50% larger transformers.
- Retention of fire protection to the existing and new transformers through out the changeover with a reduction of site construction time by the pre-fabrication of major works offsite.
- Provision of a reliable, fast response fire detection system impervious to severe electro magnetic interference (EMI) and radiation to prevent spurious operation.
- Modelling the fire protection systems in 3D to ensure design accuracy, clash detection, nozzle performance and detector view scans prior to the commencement of the works.

Having experienced the design complexities resulting from congestion, extensive installation time, high material cost and associated delays encountered during the installation of four similar sized transformers some 6 years earlier, using standard water spray protection with wet pilot detection, a new innovative approach was called for to deliver an improved outcome.

A decision was made to utilise proven off shore techniques that associates of FSS had acquired from experience in the North Sea, Brazil and Asia. A design philosophy utilising a Foam-Water Spray (Deluge) System was presented to the Principal Contractor and the Client for ratification. Based on this initial design approval to proceed to detailed design was given, producing the following results.

Foam-water spray deluge coverage over transformer

Challenge 1:

Compliance with existing local and international codes of practice – NFPA 16 and the utilisation of the existing water supplies to protect the 50% larger transformers.

Transformers required a water design density of 10 mm/min/m^2 over the total surface area of the unit and all appendages. A foam-water spray system requires 6.5 mm/min/m^2. Additionally a water design density of 6 mm/min/m^2 over the adjacent non-absorbing surface area surrounding the transformer compared to 4.1 mm/min/m^2 with the addition of foam. The decision to inject a foam liquid into the water stream would compensate for the enlarged protection surface area of the hazard.

Resolution – The system would be a foam-water spray (deluge) system in accordance with NFPA 16. The decision to use a 3% solvent free AFFF foam liquid was supported by the Client based on environmental issues. My consultancy advocated the no water – no protection principal therefore in considering we had primary and secondary water supplies, FSS elected to use a diaphragm tank balanced pressure proportioning system for each Cell Line manifold. To achieve the minimum 10 minutes operating time based on the individual operation of each system due to the blast wall separation, a 1,100 L tank with DN150 ratio flow proportioning device in the water supply line upstream of the four deluge valve sets.

Challenge 2:

Retention of fire protection to the existing and new transformer through out the changeover with a reduction of site construction time by the manufacture of major works offsite.

New blast walls (having been an integral part of the initial works) to accommodate the new enlarged transformers allowed the majority of issues to be overcome.

Resolution – The ideal location for the new reticulation system was the top of the blast walls which allowed the existing systems installed immediately adjacent the transformers to stay

Transformer bays and reticulation system

in place until removed. This provided the ideal platform for a new single pipe configuration each side of the transformer bay. Applying the "KISS" principal – a DN150 supply from the respective deluge valve to each bay with a DN 100 / 80 nozzle branch line each side of the bay with sidewall sprinklers below the control room in each bay.

The new system utilises special application DN25 fixed nozzles with adjustable fog patterns capable of providing the coverage required over a projected distance of 7+ meters at a flow rate of 227 L/min at a minimum operating pressure of 413 kPa. Due to the coverage requirements, the final nozzle configuration would exceed the minimum quantity required and the application rate required by approximately 25%.

Having reduced the reticulation system by some 50%, we modelled the deluge valve manifolds inclusive of all trim for fabrication, assembly and finishing. The two pre-fabricated manifolds were shipped to site and craned into position and connected to the water supply termination points. The foam liquid diaphragm tanks were also shipped to site complete to provide the head end deluge control facility.

Challenge 3:

Provide a reliable fast response fire detection system impervious to severe electro magnetic interference (EMI) and radiation to prevent spurious operation.

Providing a Year 2000 fire detection and alarm system solution would require upgrading the existing Fire Indicator Panel (FIP) to accept fibre optic communications from new remote control panels at each Cell Line manifold.

Resolution – The new FIP utilises the existing conventional alarm zone circuits along with new alarm zone circuits to accept new flame detection, manual release and other inputs from low pressure and discharge pressure switches.

Two multi-spectrum flame detectors tested and proven impervious to RFI were provided to ensure fast, accurate detection of a fire situation and automatic activation of the Foam-Water Spray Systems via the new FIP.

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Foam-water spray deluge coverage below oil coolers

Emergency Warning Systems integral to the local FIP, were provided for the transformer control rooms to alert that a problem exists in that immediate area. Horn speakers and rotating beacons in each transformer bay operate simultaneously throughout the respective Cell Line Bays.

Challenge 4:

Model the fire protection systems in 3D to ensure design accuracy, clash detection, nozzle projection and detector view scans prior to the commencement of the works.

Resolution – The integration of our company's 3D Modeling Program interfaced with the clients Project Plant Design System allowed the designer to view the location of the flame detectors and nozzles with the given angle of projection to fully anticipate the field results prior to the installation of the system. In addition clashes with other services were avoided and the project goal of off-site pre-assembly was maximised so that the foam-water spray (deluge) system was able to be installed in a short time span with minimum site work and dislocation to other services.

Implementation – In concluding this example of a major Foam-Water Spray Deluge System, I am pleased to report the results of the commissioning tests proved the performance exceeded NFPA 16 requirements on the transformer and surrounds, to providing the client with an effective system, on schedule, within budget and fit for purpose.

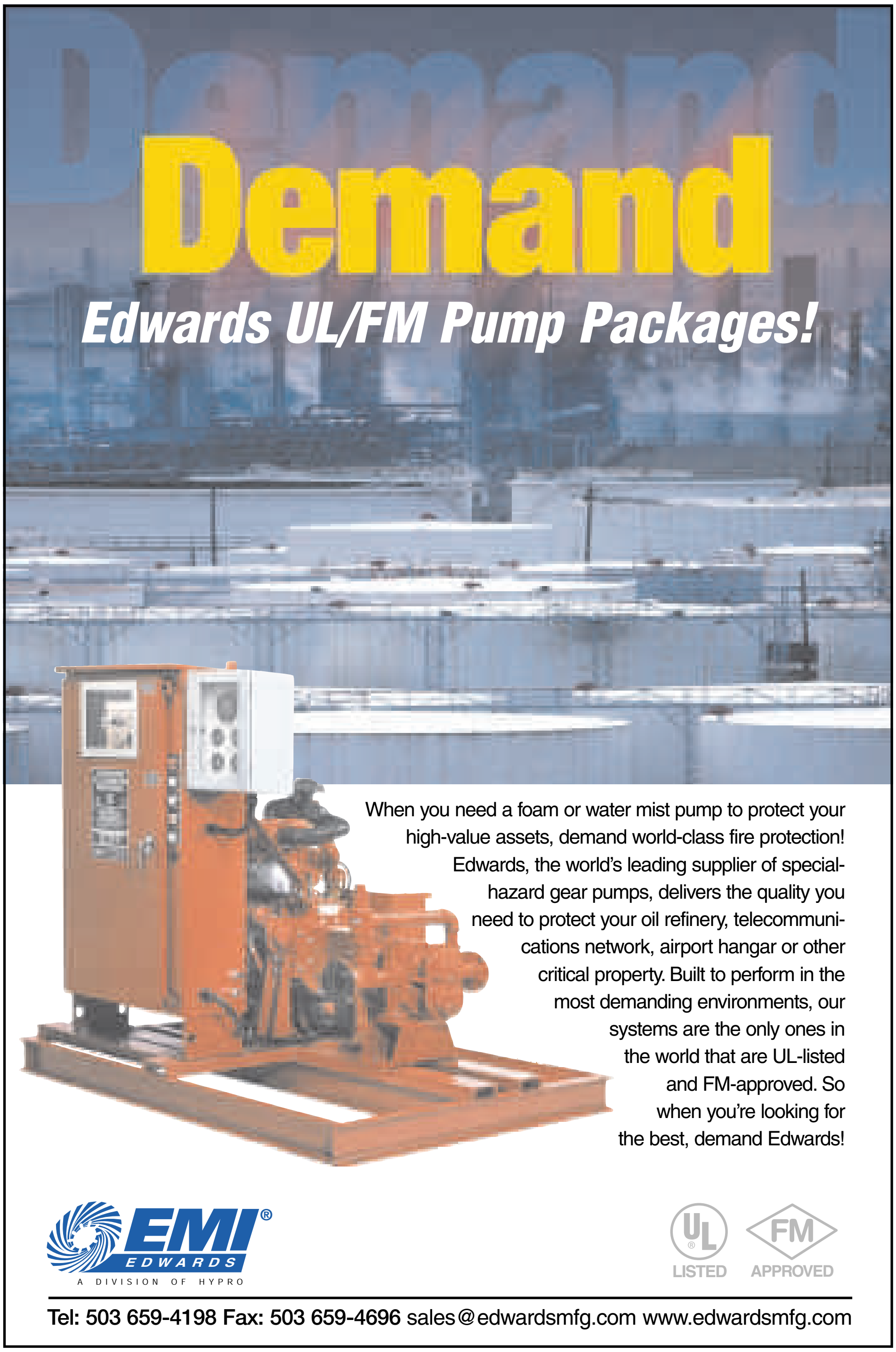
Whilst presenting this commentary on Deluge Systems, I cannot overlook the importance of ongoing and regular maintenance. I must restate my previous advice that the reliability of any form of deluge system is reliant on an effective ongoing testing and maintenance program.

Doug Pickersgill was born in St George, Queensland, Australia. His entire working life has been spent in the fire protection industry starting as a cadet engineer with the Wormald Group in Australia. During a career spanning 40 years, he has lived and worked in Japan, USA, Brazil and England where he was involved at the 'sharp end', developing innovative design philosophies and technical solutions to protect unorthodox and special hazards.

Continuous involvement with the Power Generating, Petroleum, Mining, Marine, Defence, Telecommunication and Transport industries has resulted in a unique understanding of risk management and loss prevention best practice across these areas.

Doug Pickersgill is credited with being one of only two non-US citizens invited to contribute to the development of NFPA2001, the most widely used standard covering the introduction of new 'clean agents' following the demise of Halon gases, and NFPA750, a standard dealing with emerging 'water mist system' technologies.

Doug Pickersgill is the principal of Fire & Safety Systems (FSS), an Australian consultancy that attracts clients who are owners of high value and often unusual risks needing to be protected against fire, a challenge FSS thrive on. (www.f-ss.com.au)



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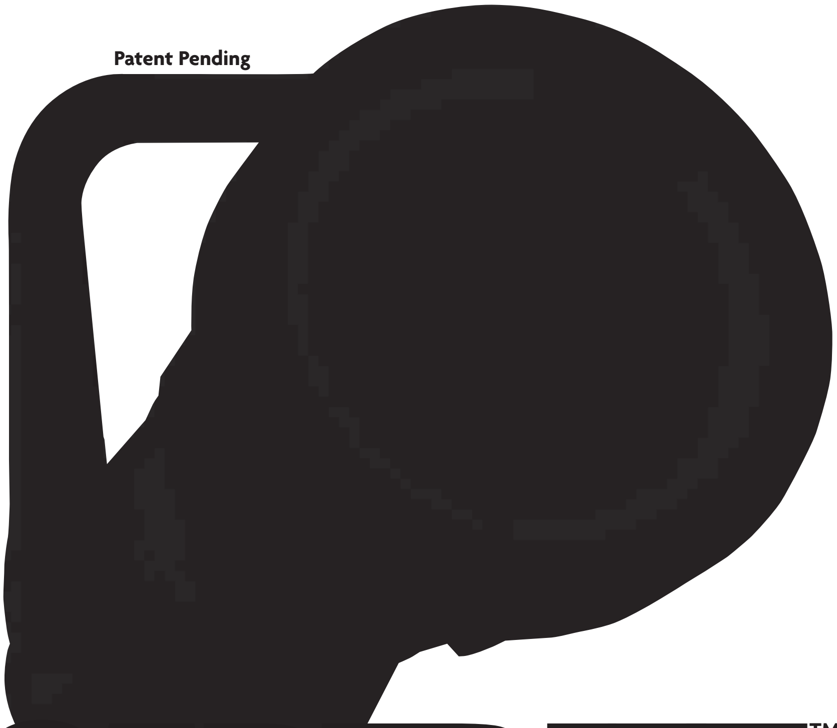

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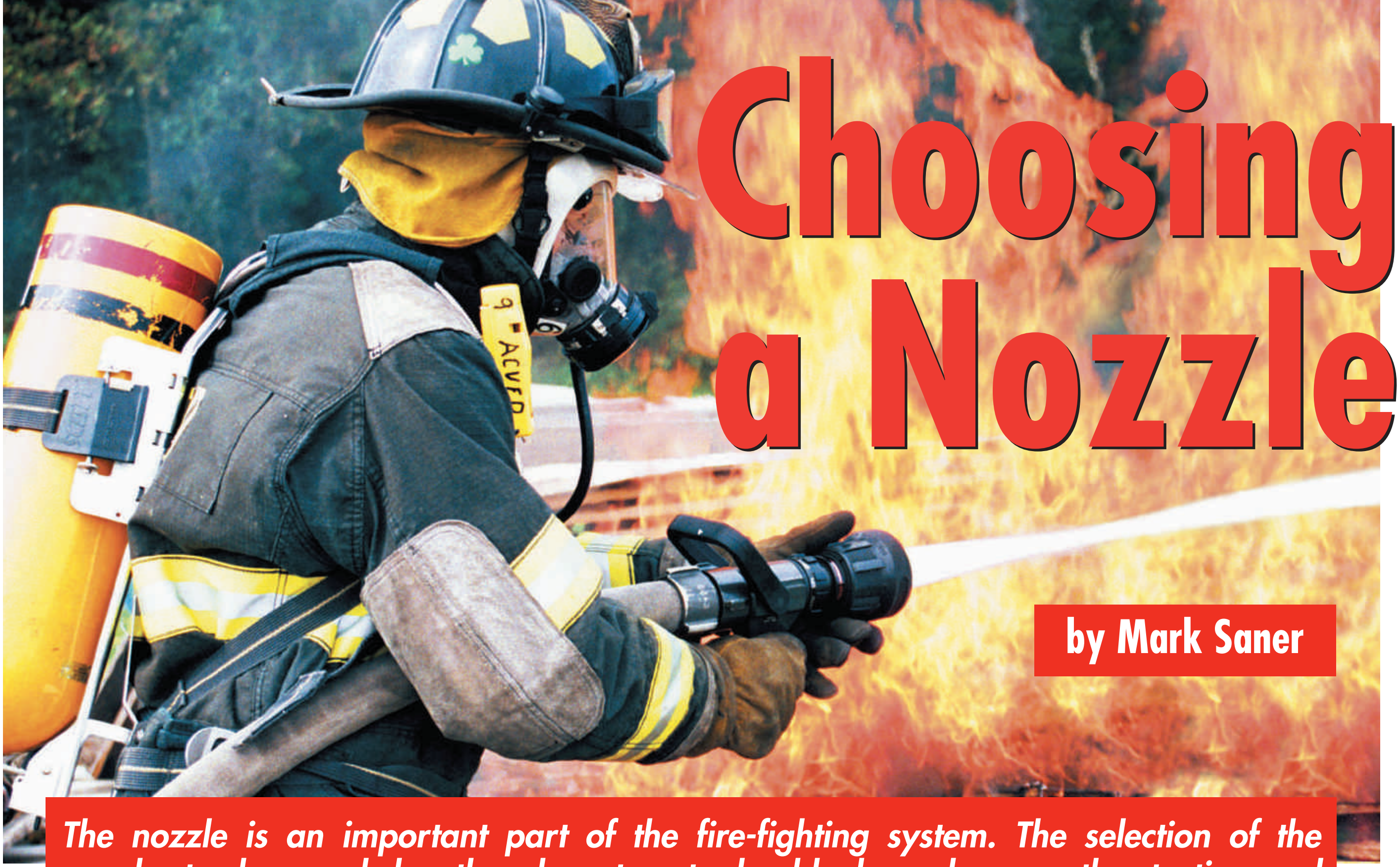

Choosing a Nozzle

by Mark Saner

The nozzle is an important part of the fire-fighting system. The selection of the nozzle to be used by the department should depend upon the tactics and performance required. You should decide what you want your nozzle to do before making your decision.

What Nozzles Do

Nozzles are designed to help put out fires by getting the right amount of water, in the right form, in the right place.

Nozzles have three main functions:

CONTROL FLOW

The size of the orifice in the outlet of the nozzle controls the flow.

PROVIDE REACH

The nozzle creates a restriction at the end of the waterway, which changes water pressure to velocity. Velocity provides the reach, which is necessary to get the water to where it is needed.

CREATE SHAPE

Different situations require different methods of applying water or foam. Some situations require the reach and penetration of a straight stream, while others require the heat adsorption capability or radiant heat protection of a wide-angle fog spray.

Nozzle Options

There are five basic nozzle types:

1. Solid bore
2. Single gallonage (sometimes called variable pressure/variable flow)
3. Adjustable gallonage
4. Automatic or constant pressure
5. Multi-Purpose Nozzle (combination solid bore and fog)

Of the five, the latter four make up a group of nozzles commonly called combination nozzles because they produce both a straight and a fog stream.

SOLID BORE NOZZLE

The solid or smooth bore nozzle is the most basic of the four nozzle types, both in design and function. Its purpose is to produce a solid stream, which provides maximum reach and penetration.

SINGLE (FIXED, OR VARIABLE PRESSURE/VARIABLE FLOW) GALLONAGE NOZZLE

The single gallonage nozzle, the simplest form of the combination or fog nozzle, provides flow at a predetermined rate that cannot be altered significantly while in use. However, when the nozzle pressure is varied the flow varies. Some of today's single gallonage nozzles can provide quality patterns even at reduced nozzle pressures.

ADJUSTABLE GALLONAGE NOZZLE

Today's adjustable gallonage nozzles allow the nozzle operator to manually select a desired gallonage without shutting down. Like the single gallonage nozzle, some of today's adjustable gallonage nozzles can provide quality patterns even at reduced nozzle pressures.

AUTOMATIC (CONSTANT PRESSURE) NOZZLE

An automatic nozzle is designed to maintain a relatively constant pressure over a wide range of flows. This is accomplished by a mechanism in the nozzle that automatically adjusts to an increase or decrease in flow to maintain pressure, and thus reach, fairly consistent. However, these nozzles can give you consistent reach while sacrificing flow.

MULTI-PURPOSE NOZZLE

A combination solid bore and fog nozzle, provides maximum reach and penetration, while still enabling the benefits of a fog stream at the same time or independently. This versatile nozzle has the ability for large flows at reduced pressures, and is well suited for multiple applications: interior, exterior, and high rise attacks, CAFS systems, foam applications, direct and indirect attacks, cooling, protection, and ventilation.

Picture courtesy of Akron Brass Company, Inc.

SELECTING A NOZZLE

When selecting a nozzle it is important to choose the type that is best suited for your applications. The following guidelines will help you determine which type and size of nozzle is best for you.

1 What flow range is required?

A nozzle cannot create flow. The available water, pump capacity, hose lays, etc., determine what a nozzle can achieve. The system needs to be analyzed to determine what flow range can be achieved.

Determine the maximum flow rate that can be achieved with normal engine pressures and hose lays.

Determine the minimum flow that will be required.

Consider whether the nozzle will always be used on the same hose or whether it will be used in other applications, which might require different flows.

2 How much flow can be controlled by the available manpower?

Reaction force is determined by the GPM flow, nozzle pressure and pattern. First determine the maximum flow that can be controlled by the available manpower.

3 Are different patterns required?

Decide whether a solid bore nozzle or fog/straight stream nozzle is required. Quality fog nozzles produce almost as good a straight stream as a solid bore nozzle but do require a higher inlet pressure. The reach of a quality fog nozzle at 100psi is about the same as that of a solid bore nozzle at 80psi or a multi-purpose nozzle at 50psi.

If the lower pressure performance of a solid bore nozzle combined with the patterns of a fog/straight stream nozzle would accommodate your needs best, consider a multi-purpose or break apart fog nozzle with the compact solid bore tip.

Fog nozzles are designed to provide a dispersed stream to protect personnel. Teeth are provided to break up the water into smaller droplets for better heat absorption and steam effect. Spinning teeth provide excellent break-up of water for heat absorption and steam conversion, due to the elimination of fingering, which is especially important in LPG type fires.

4 Who should control the flow – the nozzle operator or the pump operator?

Determine whether it is necessary to

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change the flow rate while operating. If so, decide whether the nozzle operator or the pump operator should control the flow rate. If the nozzle operator should control the flow rate, an adjustable gallonage nozzle could be the best choice. If the pump operator is to control the flow rate, a single gallonage (fixed, or variable pressure/variable flow), an automatic nozzle or a multipurpose nozzle would probably be the best.

5 How durable should the nozzle be?

Nozzles are designed to withstand reasonably tough service, but some nozzles will withstand more abuse than others. If durability is crucial and maintenance and repair opportunities are limited, a less complex nozzle design might be the best choice because the simplest nozzles are usually the toughest.

6 What is the level of training?

Departments provide various amounts of training for the pump operator and the nozzle operator. The nozzle should complement the training.

Solid bore nozzles require the least amount of training for the pump operator and the nozzle operator. The engine pressure depends mainly on the length and size of hose.

Single gallonage or variable pressure/variable flow nozzles require somewhat more training than the solid bore nozzle.

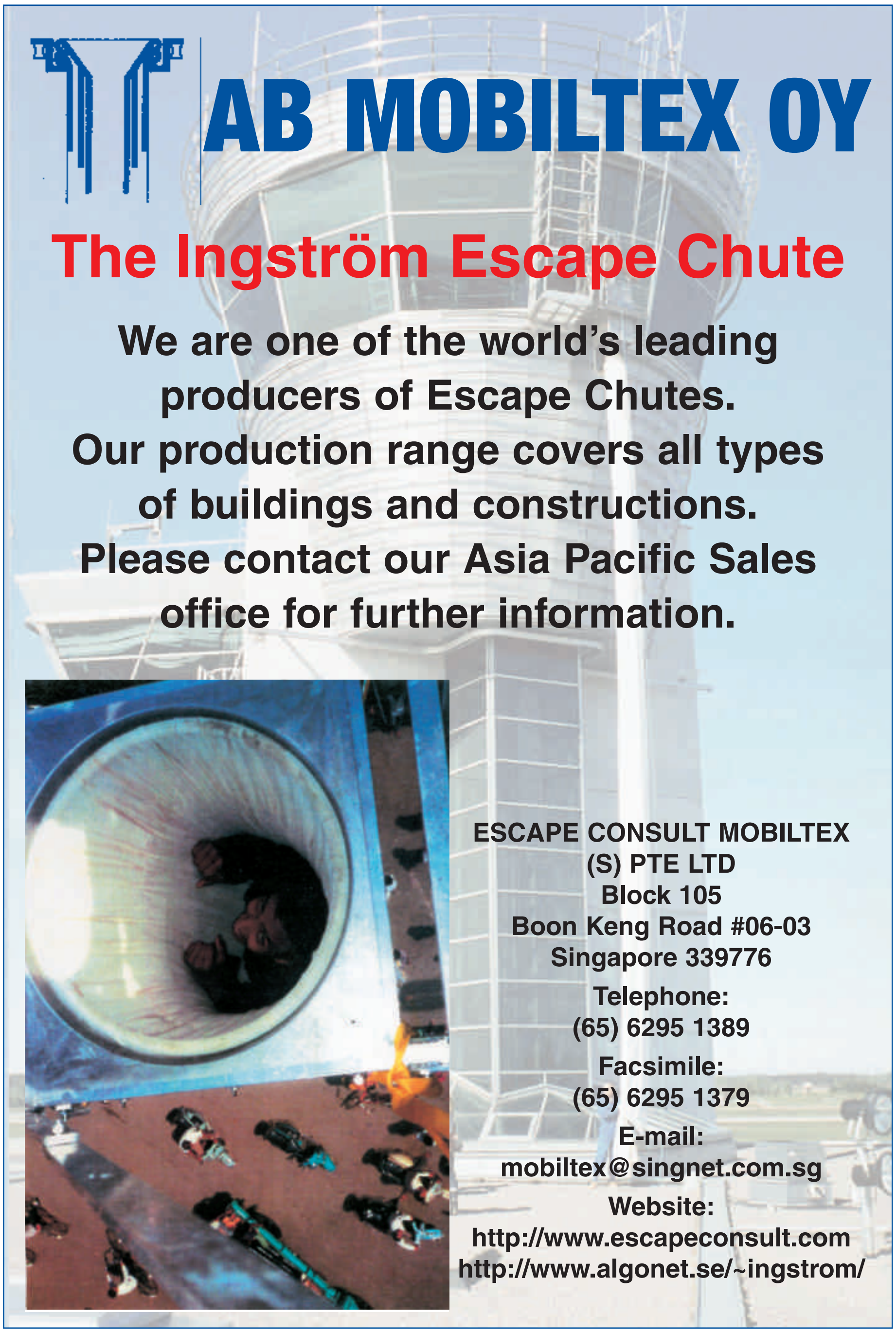
Adjustable gallonage fog nozzles require additional training of the pump operator and the nozzle operator because different engine pressures will be required for each of the flow settings with different lengths and sizes of hose.

Automatic/constant pressure fog nozzles also require additional training of the pump operator and the nozzle operator. The pump operator must be trained to accurately control the engine pressure and flow with different lengths and sizes of hoses and different operating conditions.

Multi-Purpose nozzles require additional training for the nozzle operator, because they must be trained to use the multiple shutoffs on these nozzles.

After analyzing a departments needs and considering the strengths and purposes of each nozzle, decision makers will be better prepared to choose how to spend their limited resources on the right combination of nozzles.

Picture courtesy of Akron Brass Company, Inc.



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Rights of Access + Rights In *Evacuation & Rescue*

by John Ng

With the Disability Discrimination Act and Health & Safety legislation now in place, building owners and employers must provide adequate means of escape for all occupants of buildings. In the event of an emergency evacuation – it can happen any time, every building occupant, visitors and employees have a right to egress, which is the responsibility of building managers and employers.

Historically, Building Regulations in most countries have focused on the provision of equal access rather than equal egress as most tall buildings are designed for 'defend in place' strategy. Hence, most high-rise buildings are not designed to ensure that everyone in the building has equal opportunity to evacuate quickly when the use of lifts is considered unsafe for use in extreme emergencies.

BASIC ETHICAL PROBLEM

In considering growing ageing population worldwide, it is important to realize that in the context of high rise evacuation, it is estimated about 30% of the total building population who may have difficulty or no ability to walk down stairs unassisted during emergency evacuation. Protecting this group of occupants while they remain in place waiting for rescues can be a viable option for high-rise buildings. However, this exposes the true risk to this group of people as to what the effects will look like in the event of a major fire evacuation or other critical happening include tornadoes, earthquake, terrorist threats, and even extended power outages that may require partial or total building evacuations. Current building designs may not be 'unsafe' in terms of evacuation of people with disabilities, but more could be done to provide alternative means of egress to ensure they get to ground level quickly and safely in the event that the emergencies get out of control.

Picture courtesy of AB Mobiltex Oy

Picture courtesy of AB Mobiltex Oy

HIGH-RISE EVACUATIONS

In general, high-rise buildings present many very unique and difficult challenges during emergency evacuation, rescue, and fire suppression. The evacuation process may take many hours to get people out of a tall building during a fire, especially if the normal means of egress, such as lifts, are not working and/or several stairwells are impassable because of smoke, heat or flames.

The initial reports of the events of September 11th last year have shown a successful evacuation of so many of the building occupants who have the ability to walk down the stairs before the building collapsed. Yet, the fatality figures were high and it leave us all with some soul searching in respect to trying to visualize what it must have been like for those trying to escape but have no ability of walking down stairs unassisted.

Fire authorities recognize the difficulties of evacuating people from high-rise buildings, especially elderly and disabled people in extreme emergency situations. The building managers and emergency services today will face new challenges to do more to ensure safer and quicker escape of all building occupants and rescuers in a major emergency. Many fire departments deem that a building's fire safety manager should be responsible for the safe evacuation of all people, which is not dependent on the fire brigade. Some fire departments have even approve the use of fire lifts for evacuation of people with mobility impairments, while others deem this method too risky.

Whilst life safety is of paramount importance so is the ability to empty the total building population in the shortest possible time if extreme emergency arises. An international standard should be adopted by fire and building authorities to provide a clear definition of building management responsibilities as well as the provision of egress means to allow the safety manager to ensure the safe evacuation of all mobility-impaired people in the event of total evacuation.

EMERGENCY PREPAREDNESS

No ones like to contemplate the possibility of a high-rise evacuation. After the September 11 incidents in the U.S.A and all the recent terrorist threats, the owners of private and public tall buildings worldwide are more aware of the significant importance on the emergency preparedness for mass evacuation. They are looking into ways and means in improving the ability to empty the total building population in the shortest possible time

# of Egress = Lowest Risk

in the event of worst conceivable scenario for their buildings.

Just as we accept the daily use of lifts to gain access to every floor in high-rise buildings, so too there are ways that must be taken to ensure that all building occupants can also get down and out in the absence of lifts during emergency evacuation. A safer strategy would be to get as many people evacuated out of a blazing high rise in a predetermined evacuation plan than having to depend on firefighters to perform height rescue operations is the only acceptable way in guaranteeing life safety prevention.

Although current fire regulations do not require buildings to provide escape chutes for escape or rescue purposes, building owners in many countries have installed escape chute system to meet their evacuation requirement as part of emergency preparedness. The combined use of escape chute and stairways for mass evacuation would take much lesser times to complete.

TECHNOLOGY AND INNOVATION

Since 1982, evacuation via escape chutes has been an alternative means of escape to staircase in multi-storey structure; provide the answer to make means of egress available to all people. The escape chute works on the principle of gravity, using the stress and friction method. It needs no power supply, has no stairs, usability for all people, regardless of body size, shape and weight, and allows even disabled or injured on stretcher and unconscious people to be safely and effectively brought to ground level in the event of a fire in a multi-storey structure. It is estimated that over a million people have tested the escape chute evacuation from two stories and higher.

There are several types of escape chutes, reusable preparedness solution to help evacuate occupants in building and rescue purposes in the quickest timeframe possible, while maintaining safety:

Multiple-entry: The multiple escape chute system is installed inside a protected vertical shaft enclosure in a new building or retrofitted in an existing building. The installation is constructed in accordance to international fire code that provides protection from fire effects for evacuees so that it can be used safely for emergency egress. The chute is permanently available at each level inside the fire protected shaft, one segment of chute per floor, from the highest floor to the ground floor on the same vertical line with no length and height constraints. Evacuation takes place inside the building and occupants can gain access to the chute at each floor where several levels can be simultaneously evacuated.

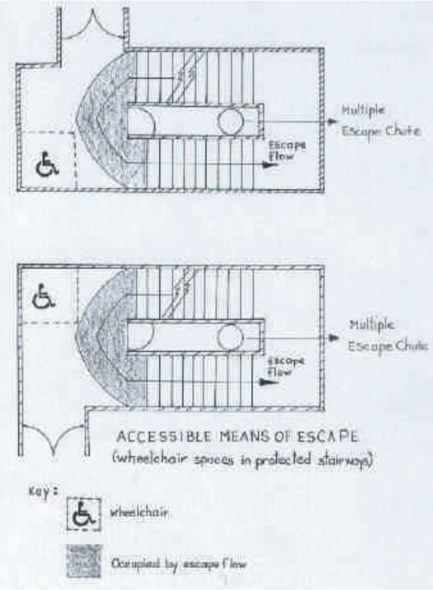
Single-entry: The one-entry escape chute is installed in old or existing building whereby there is no possibility of incorporating the multi-entry chute. It is designed for installation at window, balcony and rooftop of multi-floor buildings from two storeys upward to maximum of 200m in height; best serves the occupants of that particular floor. This exterior chute is constructed of three layers, and this three-way protection protects the evacuees once inside the chute from fire, heat, and smoke during evacuation.

In countries where no fire regulations are enforced, there will be situations where the minimum number of exits in a building or floor(s) may not be enough to cater for the occupants due to a change of occupancy classification or an increased in occupant load over the time. In many situations, escape chutes are acceptable by fire authorities as a practical alternative exit in buildings where it is not possible to provide additional exits or increase the size of existing exits for mass rapid evacuation.

ACCESSIBLE MEANS OF ESCAPE METHOD

Current fire regulations do not require buildings to provide facility for equal egress, however building owners in many countries have adopted a new solution in making their buildings egressible for everyone during evacuation. It offers worry-free solution and reduces the risk of injury to the disadvantaged who have difficulty or have no ability to use stairs in getting out of the building.

This emergency egress design is a unique and integral part of the enhanced staircase development. It exceeds the current vertical exit provision and further enhanced the safety of evacuation in tall buildings. This egress design requires the ability of incorporating the facility of multiple escape chute system at the core of the stairwell inside the enhanced staircase enclosure. The use of escape chute and exit stairs can evacuate building populations faster. It simultaneously grants occupants their right to evacuate while giving priority to fighters.



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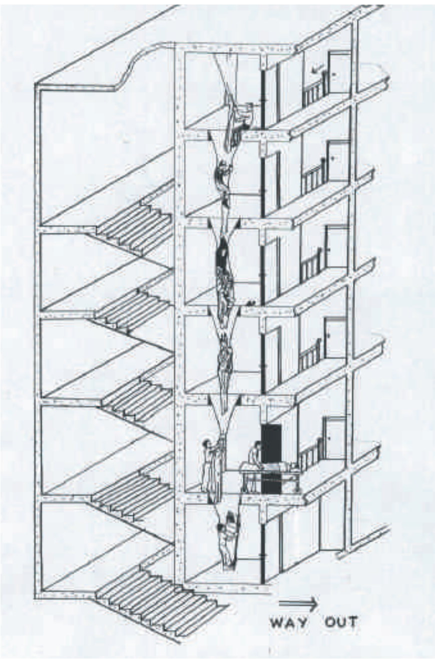


Picture courtesy of AB Mobiltex Oy

Given this means of egress is designed in accordance to international fire code to prevent entry of fire and smoke into the enhanced stair enclosure with the multiple-entry escape chute system, this enclosure becomes a safe zone for refuge after a fire starts. When fire occurs, mobility impaired people and the disabled will have to make their way, assist or unassisted, and take temporary refuge inside this stair enclosure while waiting for rescue. They can either choose to use the chute inside the stair enclosure to slide down to the ground or to be assisted by helpers down the stairs. Such emergency exit system for persons who use wheelchairs or are otherwise unable to use stairs would not only save the lives of people with disabilities but also of rescue workers who would not have to put themselves at risk to rescue disabled people in tall buildings.

CONCLUSION

The development of code and standards will make it possible for future buildings to become conducive for access and egress to everyone. The need to adopt a universal approach to equal egress design would give the mobility-impaired people the same ability that able-bodied people have for vertical exits, making high rise evacuation quicker and relatively safer.

The Breathing Apparatus Airline

When Only Fresh Air Will Do

Decontamination in progress (part of a training session at the Civil Defence Academy, SCDF)

by Lta Tan Kim Guan
Senior Instructor
Fire Fighting Specialists Branch,
Specialists Training Wing, Civil Defence Academy,
Singapore Civil Defence Force

> *The continued development of the breathing apparatus (BA) has therefore been crucial for rescuers, firefighters and hazmat responders alike. It has allowed them to operate in the most hostile of conditions and, more importantly, reach casualties and save lives.*

When conducting firefighting and rescue operations, firefighters would often need to work in environments in which smoke and toxic or noxious fumes may be present. The burning of plastic materials can give off poisonous gases, whilst leaking chemicals in hazardous material incidents can release poisonous fumes. Thick dust clouds can also result from collapsed structures, such as the choking conditions experienced by responders during the September 11th terrorist attacks on the World Trade Centre in New York City. These can all provide an untenable environment for firefighters and rescuers.

The continued development of the breathing apparatus (BA) has therefore been crucial for rescuers, firefighters and hazmat responders alike. It has allowed them to operate in the most hostile of conditions and, more importantly, reach casualties and save lives. The development of the BA Airline has made further inroads into the use of the BA set by prolonging its usage.

The BA Airline provides several hours of respiratory protection to its users as continuous air supply can be maintained through the airlines linked to a cascade of cylinders and to the open circuit facemask and regulator.

THE AIRLINE ADVANTAGE

In its standard form, conforming to BS 4667 Part 3, the BA Airline essentially comprises a facemask, a demand valve and a length of hose. This hose is connected to compressed air cylinders which provide the air supply. The cylinders are located outside the risk area. Either one or two users may be connected to the BA Airline.

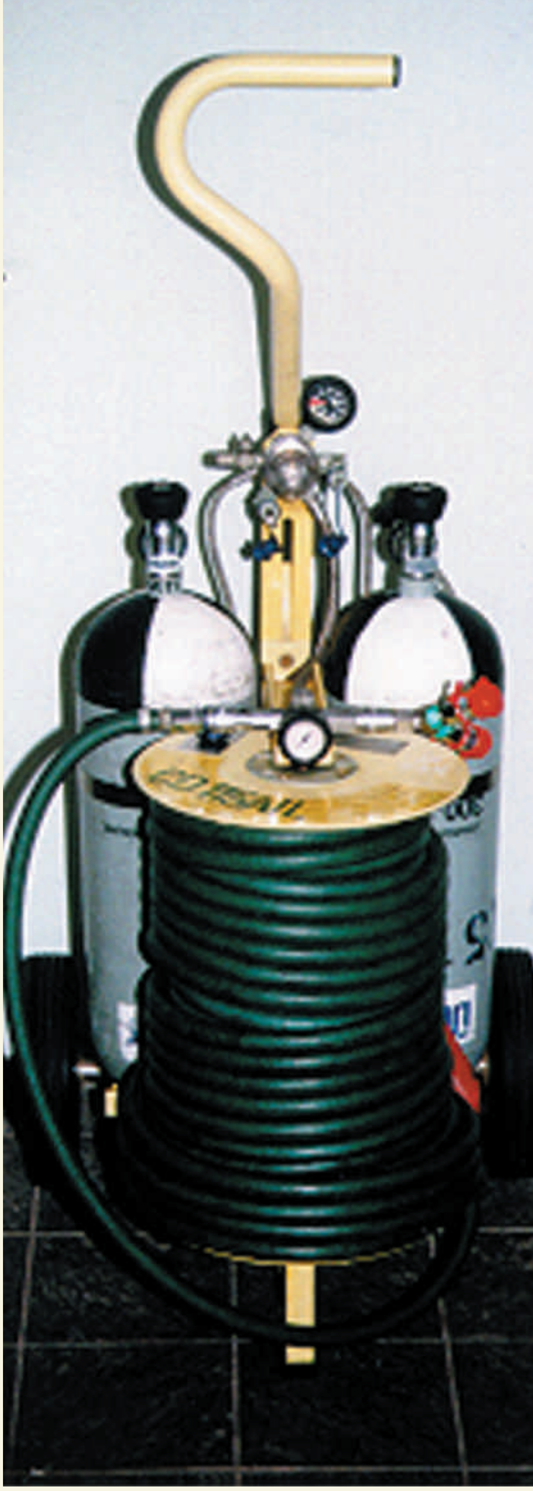
The BA Airline provides several hours of respiratory protection to its users as continuous air supply can be maintained through the airlines linked to a cascade of cylinders and to the open circuit facemask and regulator. The smaller air cylinders of a BA set have a limited capacity and would hence require frequent replacement.

This extended supply of oxygen in turn allows rescuers and firefighters more working time, enhancing both their operational effectiveness and confidence. One limitation of a BA Airline, however, is that it does not facilitate the users to make multiple turns, or to penetrate into confined spaces with obstacles that require significant maneuvering.

BA Airline users also don self-contained breathing apparatus during operations. The latter serves as a back up should the Airline user encounter difficulties such as entangled, kinked or ruptured hoses.

STYRENE SPILL INCIDENT: THE BA AIRLINE IN USE

On 24th October 2001, SCDF Hazmat Responders from the Tuas Fire Station attended to a chemical incident involving leakage of Styrene from a 600m^3 (430 Metric Ton) storage tank. Styrene is a chemical known for its flammability and explosive characteristics, with a flash point of 32 degree celsius.


BA airline equipment

Styrene leakage

When the Hazmat Responders arrived at about 1430 hrs, Styrene was seen splashing rapidly out of one of the delivery valves. Exposed styrene vapour can ignite explosively should it come into contact with an ignition source.

Under the sweltering heat of the afternoon sun, the initial task was to initiate isolation and cooling operations. The leaking chemical had to be isolated and prevented from excess heat source or naked flames. Foam and

The Breathing Apparatus Airline

> *Throughout the operation, the BA Airline proved essential. It provided the responders more time and flexibility to carry out the elaborate and careful mitigation and subsequent decontamination procedures.*

water were used for these operations. The tank from which the chemical was leaking from was gradually cooled down which prevented the leaking Styrene vapour from reaching its flash point.

In addition, the Hazmat responders had to mitigate the leakage as soon as possible. Donning chemical suits for respiratory and body protection, they effectively plugged the leaking valve and transferred the remaining Styrene from the tank to an International Standard Organisation (ISO) tanker. The entire operation took more than an hour.

Throughout the operation, the BA Airline proved essential. It provided the responders more time and flexibility to carry out the elaborate and careful mitigation and subsequent decontamination procedures. The combination of cumbersome chemical suits and the extended duration of this operation demanded greater strength and stamina from responders – something which the extended capabilities of the BA Airline easily supported.

The use of the normal BA equipment with their limited air supply would have greatly handicapped the operations, requiring the users to replace their cylinders every 30 to 45 minutes. (A cylinder with 9 litres of air contents would normally last for about 35 minutes.) This would have required the users to leave the hot zone in the midst

> *The use of the normal BA equipment with their limited air supply would have greatly handicapped the operations, requiring the users to replace their cylinders every 30 to 45 minutes.*

Safety Considerations

- The Airline user should also be equipped with a Distress Signal Unit, a torch and communication equipment so that he may remain in touch with the BA Control Officer (BACO).
- The Airline hose shall not exceed 90 metres, or a pressure reduction in the hose may take place. When this happens, the wearer may begin to consume and exhaust the air from his standby BA cylinder.
- Not more than two Airline wearers should be connected to any single airline. This is to ensure that there is adequate, continuous uninterrupted air supply. A third Airline wearer would seriously reduce the air contents and compromise their safety.
- A BACO shall monitor the entry and exit of Airline wearers, taking note of their entry/exit time. He shall also standby an emergency team to initiate emergency search procedures should an Airline team fail to return on time or radio communication is lost.
- The air cylinders should also be closely monitored for their contents to ensure that there is sufficient air supply. Provision should also be made available to rapidly replace depleted cylinders.

(Additional precautionary measures are documented in the Manual of Firemanship under "Breathing apparatus and resuscitation".)

of their operations, undergo decontamination process, remove their chemical suits and replace their depleted BA cylinders. Alternatively, It would have required deployment of more hazmat respondents to take over those who needed to leave the scene to replace their depleting cylinders. In all, the situation would have been unnecessarily prolonged with excess dependence on manpower and equipment.

Hazmat Responders conveying a casualty during a simulated Hazmat incident

FURTHER USES OF THE AIRLINE

The BA Airline offers widespread use for the SCDF. Aside from Hazmat operations, the SCDF has improvised its usage for the operation of commonly used pneumatic equipment such as the Airgun, Leak-sealing Lance, Pneumatic Cutter and Air Lifting Bag. This has been achieved by connecting them to the BA Airline which supplies the compressed air at the operation ground.

The BA Airline offers widespread use for the SCDF. Aside from Hazmat operations, the SCDF has improvised its usage for the operation of commonly used pneumatic equipment such as the Airgun, Leak-sealing Lance, Pneumatic Cutter and Air Lifting Bag.

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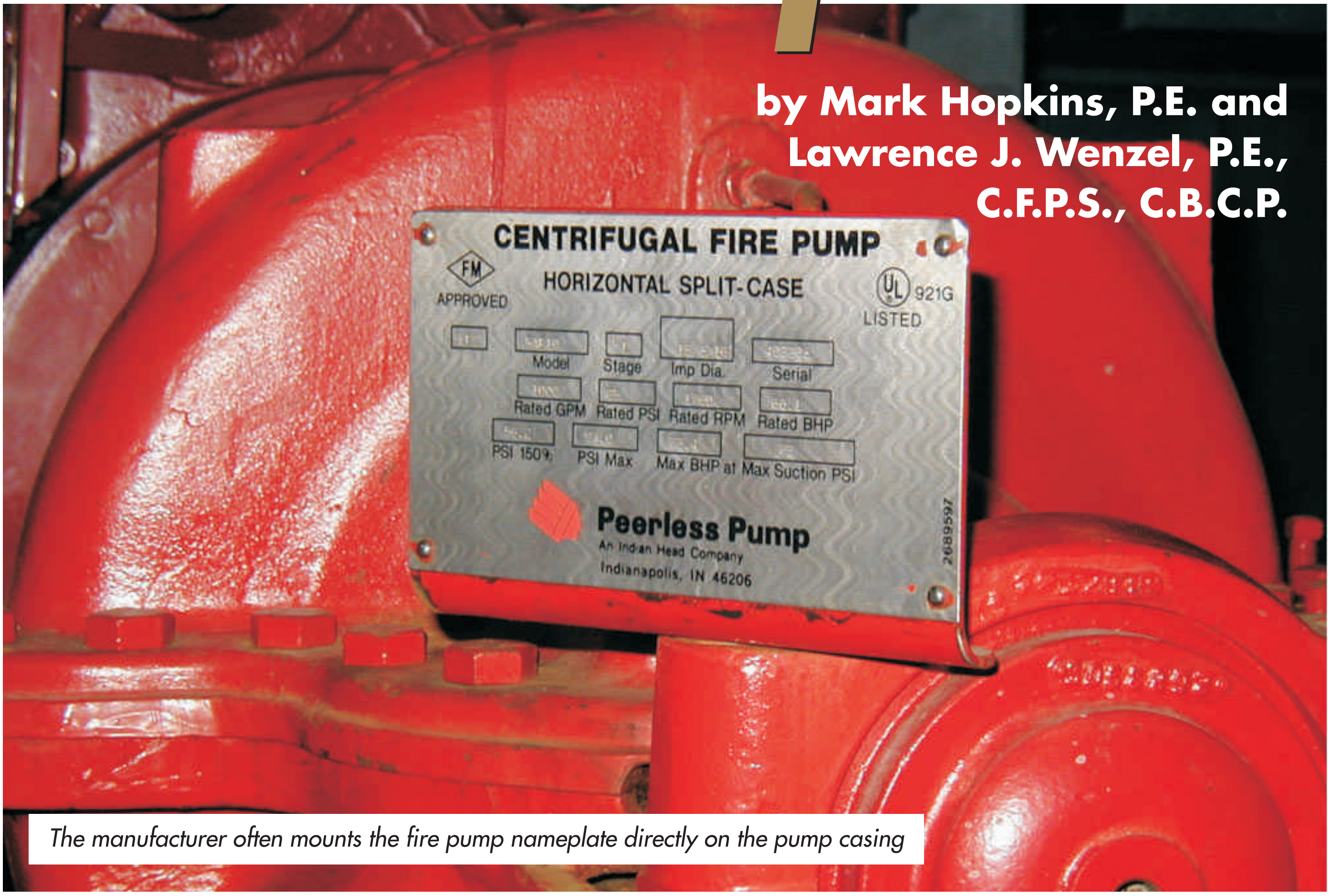
Fire Pumps and

by Mark Hopkins, P.E. and
Lawrence J. Wenzel, P.E.,
C.F.P.S., C.B.C.P.



The manufacturer often mounts the fire pump nameplate directly on the pump casing

A SITUATION OCCURRED in a 10-story high-rise building in Florida. The water demand for the building's sprinkler system required the contractor to install a fire pump. However, the design of the combined standpipe and sprinkler system piping could not withstand the pressure increase provided by the fire pump.

The design included an electric motor-driven fire pump, capable of flowing 1000 gallons per minute (gpm) at a discharge pressure of 130 pounds per square inch (psi). The municipal water system supplied a static pressure of 55 psi and a flow of 1000 gpm with a residual pressure of 43 psi at the pump suction flange. This provides a combined pressure of 173 psi at the discharge side of the fire pump when the pump flows 1000 gpm. Because this particular pump provides 120% of the rated pressure with no water flowing – sometimes called the "shutoff" or "churn" condition – the pressure rises to 210 psi. Thus with little water flowing, such as when a single sprinkler head operates in the early stages of a fire, the piping must endure relatively high pressure.

Rather than using piping and equipment rated for the higher pressures, as required by NFPA 20 – 1999, *Standard for the Installation of Stationary Pumps for Fire Protection*, the contractor chose to rely on a fire pump relief valve. He set the relief valve to operate at 175 psi. The contractor reasoned that this arrangement would allow him to use standard piping and equipment rated for 175 psi. Obviously, this would reduce the installation cost of the fire protection systems.

Sadly, using a fire pump relief valve to maintain the system pressure at or below 175 psi does not comply with the requirements of the Standard. NFPA 20-1999, Section 2-2.4 states, *"The net pump shutoff (churn) pressure plus the maximum static suction pressure, adjusted for elevation, shall not exceed the pressure for which the system components are rated".* The supporting information in Appendix A, Section A-2-2.4 specifically identifies the use of a relief valve to reduce the overall pump operating pressure as a "poor design practice."

Unfortunately, no one discovered this design flaw until the day before the scheduled opening of the building. In fact, the discovery occurred just as the contractor had begun to prepare for the acceptance testing of the pump. Based on this information, the Authority Having Jurisdiction declined to accept the system. This prevented the building from opening on time.

The contractor and the design engineer now had to face the problem of correcting the design flaw. They had limited options available. They could replace the system piping for the standpipe and sprinkler systems on the lower levels of the building. Or, they could add one or more pressure reducing valves.

FIRE PUMPS

A common misconception exists that fire pumps can add "capacity" to volume-deficient water supplies. Fire pumps do not create water. Thus, if an insufficient quantity of water exists to supply the pump, the pump will do no good. Fire pumps simply add energy to increase the pressure for a given volume of water.

Contractors install fire pumps where a water supply has a *pressure deficiency* for fire protection or manual fire fighting needs. This condition may occur where the water supply must come from a low-pressure static water source, such as a low-pressure public water system. In the past, fire pumps supplied by a connection to a public or private water distribution system or to a gravity tank have often been referred to as "booster pumps." While still in use, NFPA 20 – 1999, no longer uses this term. Other typical low-pressure suction sources include ponds, reservoirs, cisterns, wells, low elevation ground storage tanks or, in some rare cases, swimming pools.

To accommodate application needs, a contractor may use a variety of pump types for fire protection. Today, most contractors use centrifugal fire pumps, including horizontal split case, vertical line shaft turbine, vertical in-line, and end suction pumps. In certain specific applications, a contractor may use positive displacement fire pumps. These specific applications include certain foam systems and water mist systems.

This photo shows a typical fire pump installation. This installation includes an electrically driven pump. Notice that a person standing near the fire pump controller can clearly see the pump and its driver. This meets a specific requirement of NFPA 20-1999, Section 7-2.1

The open casing of this horizontal split case pump clearly shows the impeller. The shaft from the driver connects to the pump shaft. The impeller mounts on this shaft

The new chapter 5 of NFPA 20 – 1999 provides specific requirements.

All fire pump installations consist of three basic components: the *driver*, the *pump* and the *controller*.

The driver converts energy supplied from an electrical motor, fuel-fired engine or steam turbine into mechanical force used to rotate the pump shaft. The driver connects to the pump shaft through a flexible coupling.

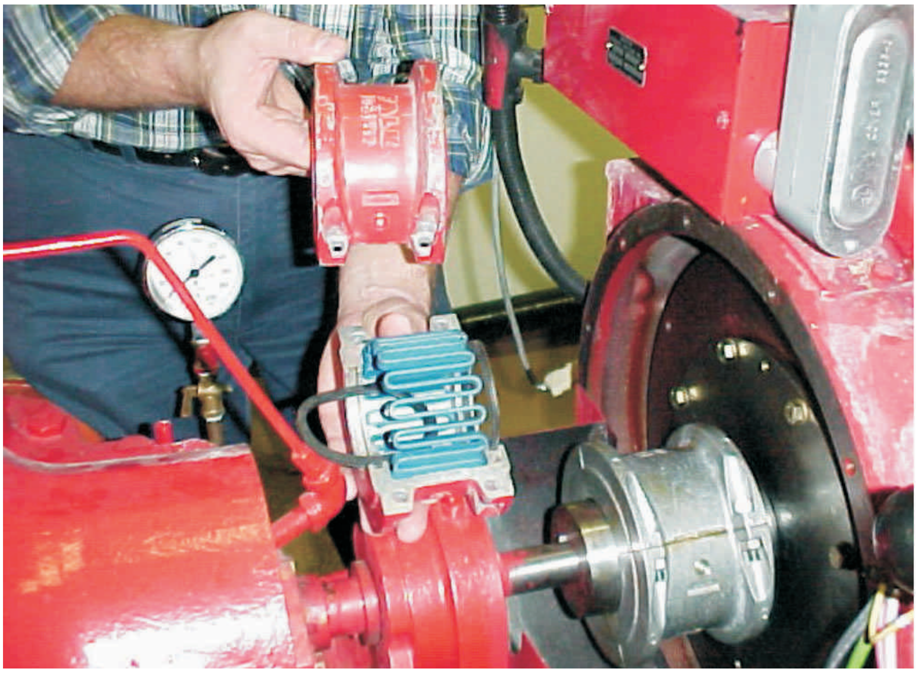
The centrifugal pump – the most commonly used type of pump in fire protection – converts the rotational energy provided by the driver into kinetic energy using a "disc" known as an *impeller*. Positive displacement pumps create pressure by compressing the water in a chamber and then releasing it into the system.

The controller serves as the "brain" of the installation. It works as a true "management tool", starting and sometimes, stopping the pump. It also acts as a remote signalling point when supervisory initiating device circuits from the facility fire alarm system connect to supervisory signalling contacts in the controller. In essence, the controller keeps an eye on the fire protection system water supply, through its ability to monitor system pressure. If the pressure drops, the fire pump controller starts the fire pump, boosting the pressure.

FIRE PUMP CAPACITIES

Fire pumps range in flow capacity from 25 gpm to 5000 gpm and net pressure delivery of 40 psi or greater, as

Fire Pumps and Valves



The flexible coupling serves as a very important component for any fire pump installation. It allows the power from the driver to transfer to the pump. If this component fails, then the pump cannot supply water. The installer must carefully align the flexible coupling. Whoever maintains the pump must make certain the alignment remains proper

identified in NFPA 20 – 1999, Section 2-3. They must meet specific flow and pressure delivery points, as part of their Underwriters Laboratories Inc. (UL) listing. The rated capacity of the pump determines these delivery points. The nameplate of the pump always contains this information.

NFPA 20 – 1999 specifies pressure limits at no-flow conditions between 101% and 140% of the rated nameplate pressure. At 65% of the rated pressure, the pump must deliver 150% of the rated flow. NFPA 20-1999 states these requirements in section 3.2, and in the appendix to this section.

SIZING FIRE PUMPS

A designer should consider several factors when sizing a fire pump for a given design application. The designer does not have to size the fire pump to meet the *exact* system demand. NFPA 20 – 1999, section A-2-3 states that fire pumps must be able to operate at any capacity between churn to 150%. However, a designer should select a fire pump for a given application within the range of 90 to 140% of rated pump capacity. This allows for some flexibility in the event that the suction supply changes.

As in the example at the start of this article, a common mistake occurs when a designer does not properly specify the pressure ratings for pipe and fittings based on the sizing of the fire pump. The maximum net pressure increase provided by a fire pump occurs while the pump operates at a no-flow condition.

To determine if the system pressure will exceed the pressure ratings of the pipe and fittings, the designer must add the available static water supply pressure to the pump's no flow pressure. Then, the designer must compare this total pressure to the rated allowable pressure listed for the piping, valves and other components.

RELIEF VALVES

A fire pump system relief valve serves as a safety device. It should only need to open when an "over-speed" condition of the fire pump driver can result in pressure exceeding the maximum working pressure for the piping and equipment installed. An electric motor can't over-speed; thus, a designer need not specify a system relief valve for an electric motor driven fire pump installation.

The designer must use a little math to determine if he or she must specify a system relief valve for a diesel engine driven fire pump installation. NFPA 20-1999, Section 2-13.1 gives the formula. The designer must compare the maximum working pressure for the piping to the *sum* obtained by adding the static pressure to 121% of the net no-flow (churn or shut-off) pressure.

Keep in mind that, as in the example outlined at the beginning of this article, the installation of a relief valve should not serve as a design option to reduce project installation costs.

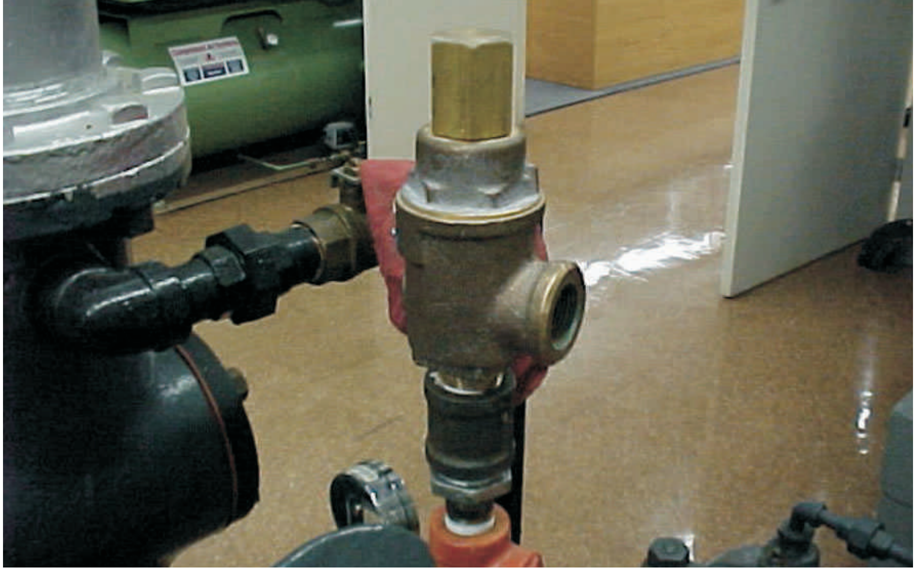
The designer must also consider some other operating conditions. When the fire pump operates at a no-flow condition, the fire pump itself can heat up. The fire pump impeller generates heat as it turns. The heat builds up if no cool water flows through the pump casing. This elevated temperature in the pump casing can cause damage. Thus, water must constantly pass through the pump. The designer must provide a method to keep the pump cool.

The designer can do this by supplying the water for the diesel engine cooling system from the discharge side of the pump. As the water flows from the pump discharge, through a heat exchanger connected to the closed circulation engine cooling system, it will also dissipate any heat that may build up inside the casing of the pump.

However, electric motor driven pumps, and engine driven pumps that use a radiator for cooling do not offer this benefit. Thus, the designer will have to specify a circulation relief valve, also known as a case or casing relief valve, to keep the pump casing cool under no flow conditions. A circulation relief valve consists of a small diameter relief valve designed to provide a small flow through the pump to waste. The contractor usually attaches this circulation relief valve to the pump casing. However, the contractor may also install this valve anywhere on the discharge side of the pump.

CONTROL VALVES

Lastly, the designer will specify the use of control and check valves to isolate fire pumps and other water supplies



This circulation relief valve mounts on top of the fire pump casing. It should have a discharge pipe from the outlet to a safe location

from one another and to allow for service and maintenance of installation components. Valves used in fire protection systems must bear a UL or FM listing mark for fire protection service.

The designer may specify either indicating butterfly or gate valves. The designer should specify valves to isolate the pump from the supply and discharge, and to allow maintenance personnel to completely remove the pump from the fire protection piping system. Appropriately located valves will also allow for pump testing without removing the pump from service.

NFPA 20-1999 disallows the use of a butterfly valve in one specific instance. The designer may only specify the use of an indicating gate valve in the suction line within fifty feet of the pump. Butterfly valves can create turbulence. This turbulence in the suction supply could adversely affect the performance of the fire pump. However, the Standard permits the use of listed butterfly valves as control valves in all other locations.

The designer will specify the installation of check valves on the discharge side of fire pumps and jockey pumps. These check valves will isolate the water supplies. They will also allow the jockey pump to maintain higher pressure in the fire protection system. This higher pressure in the system, coupled with higher starting pressures for the fire pump, will effectively eliminate water hammer. By maintaining higher pressure on the system, the fire pump can automatically start at higher pressure. This will provide higher operating pressure for automatic sprinklers and hose lines earlier in a fire.

Mark Hopkins, P.E., serves as a licensed professional fire protection engineer with the New England office of Hughes Associates, Inc., located in Warwick, Rhode Island.

Lawrence J. Wenzel, P.E., C.F.P.S., C.B.C.P. serves as a licensed professional fire protection engineer, certified fire protection specialist, and certified business continuity professional with the Connecticut office of Hughes Associates, Inc., located in Oakdale, Connecticut.

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AMERICAN PACIFIC ANNOUNCES LANDMARK FAA APPROVAL

American Pacific Corporation has announced the landmark Federal Aviation Administration ("FAA") approval of a Halotron 1 clean agent portable fire extinguisher to replace severe ozone depleting halon 1211 on civilian commercial aircraft. The Halotron 1 extinguisher, manufactured by Amerex Corporation of Trussville, Alabama, has a net weight of 5.5 lbs and was the first to successfully complete all required FAA and Underwriters Laboratories, Inc. ("UL") tests. Each extinguisher has the following label:

"FAA Approved. Meets the Minimum Performance Standards for Handheld Extinguishers as defined in Report DOT/FAA/AR-01/37."

The standard for approval was the culmination of a nine-year process started in October 1993, at the FAA Technical Center at Atlantic City, NJ.

This new Amerex Halotron 1 extinguisher provides an environmentally acceptable substitution for Halon 1211 that is extremely low in ozone depletion effect as well as global warming effect. It provides an environmentally balanced alternative that is needed for the airline industry. Halotron 1 is the most widely used halon 1211 replacement and is carried by four of the five major US fire extinguisher manufacturers, including Amerex, Badger, Buckeye, and Kidde.

The availability of this new Amerex Halotron 1 extinguisher gives airlines the dual advantage of transitioning to an environmentally acceptable product as well as a product that can be used for full training programs, once again.

For more information, please contact:
American Pacific Corporation
Tel: +1 702 735 2200
Website: www.halotron-inc.com

NEW FIRE HELMET COMMUNICATIONS KIT FROM NEW ZEALAND MANUFACTURER

New Zealand company, Audio Response Ltd has announced the release of its COM-SYS-FIRE (CSF-1) communications kit for fire fighting helmets.

Fitting many popular models of fire helmet, the CSF-1 is quickly and easily attached to the ratchet assembly at the back of the helmet.

Using a high quality bone conduction microphone which rests against the back of the user's head, it provides clear communications with or without breathing apparatus or inside a fully encapsulated hazmat suit.

The patented microphone uses a distinctly different technology from previous generations of bone conduction pickup with a significant improvement in intelligibility of speech. Due to its unique design, it provides quality communications in ambient noise levels up to 120dB.

It connects to most popular models of portable radio via a dedicated interface unit.

For more information, please contact:
Audio Response Ltd.
Tel: +61 9 8277 667
Website: www.audio-response.com

CERTIFIRE (HONG KONG)

CERTIFIRE (Hong Kong) Ltd is an independent third party product certification body incorporated in Hong Kong and is part of Warrington Fire Research Group Ltd. It provides third party certification of all passive fire protection products.

The Hong Kong Government, via HKAS, has recently launched an initiative to encourage manufacturers of construction materials generally, including passive fire protection products, to demonstrate compliance with the regulations through product certification. Product certification via CERTIFIRE (Hong Kong) is the basis by which manufacturers can provide on-going evidence of fire performance for their products and satisfy the requirements of this initiative.

CERTIFIRE (Hong Kong) will meet the requirements of ISO/IEC Guide 65 and satisfy the requirements of HKAS for accreditation. The scheme will be run in a similar way to CERTIFIRE (UK) and CERTIFIRE (Australia) in that it will be governed by a Management Committee which will seek representatives from organizations with an interest in the certification of fire protection products, such as Government Departments, Architects, Engineers and manufacturers.

For more information, please contact:
CERTIFIRE (Hong Kong)
Tel: +852 2851 8976
Website: www.wfrc.co.uk

AUSTRALIAN FIRE BRIGADE DEVELOPS FAST-RESPONSE EMERGENCY VEHICLES

Australian manufacturing engineers Charles Marshall Pty. Ltd. joined forces with New South Wales Fire Brigades Engineering Unit to develop ergonomically effective systems with a high level of operator safety for emergency response vehicles.

The need for total reliability of roll-out shelving, steps and draws was a critical design priority. Using the extensive range of "Fitzroy" slides, engineers at Charles Marshall worked with the NSW Fire Brigades engineering design team to adapt and test a multitude of slide-out fittings.

"Fitzroy" ball bearing slides were considered because of their reputation for strength and reliability in arduous field circumstances. Slide-out weights from 100kg up to 250kg had to be catered for with reach, in many cases up to 1200mm.

The prime design criteria for emergency personnel was fast and easy accessibility of their extensive array of tools, breathing apparatus and power equipment. Three HazMat Response Vehicles were purpose-built from the chassis up for fast response to hazardous materials spills.

As the "Hazmat" project progressed it became apparent that some lateral design thinking was needed to provide secure shelf locking mechanisms. The Hazmat vehicles feature a unique command centre equipped with the latest state-of-the art Hazmat systems, fax and phone and computerized scientific testing equipment to identify chemicals and gases at spill sites both on land and water.

"Fitzroy" tracks were also successfully fitted on heavy duty battery racks, refrigerators, breathing apparatus and heavy compressed air cylinders, plus an extensive variety of chemicals detection equipment, fans, spill confining systems and the like.

Mr. Hue Pham, Manager of the Unit was extremely proud of the development results and agreed that due to the ease of access to awkward and heavy gear, operator injuries and personnel downtime has been considerably reduced while simultaneously, set-up and into-action times have been dramatically improved in both Rescue and Hazardous Materials situations.

For more information, please contact:
Charles Marshall Pty. Ltd.
Tel: +61 3 9429 9044
E-mail: info@fitzroytracks.com

RADICALLY NEW FIRE SUPPRESSION TECHNOLOGY WILL MEAN RETHINKING PROCEDURES

FireAde 2000 is first product to take on entire fire tetrahedron

A new fire suppression technology is now available in from Fire Service Plus, a member company of the Safety Showers group. This new technology is so radically different from anything that has gone before that it will lead to the rethinking of many time hallowed procedures used by Airport fire teams. Based on a unique system of hydrocarbon denaturing and management it has been 20 years in developing and testing in the USA.

Because of this the product, known as FireAde 2000, is not just another fire fighting medium. Unlike water, traditional foams, powders, gels and gases used in fire fighting, its properties are such that it can effectively attack the entire fire tetrahedron. This means, at a stroke, reducing heat, eliminating oxygen, removing fuel and interrupting the free radical chain reaction, which keeps fires going.

At the same time where flammable liquids are involved, FireAde 2000 acts as an emulsifier. That is to say product, water and flammable liquid mix and encapsulate hydrocarbon molecules, thus preventing ignition or re-ignition. It's this feature that makes the product an excellent medium for cutting a non-reignitible fire path through burning fuel to rescue casualties or property. It also makes it ideal for dealing with Hazmat incidents, where FireAde 2000's use seriously reduces the risk associated with hydrocarbon spills.

Also because FireAde 2000 makes water six times wetter it acts as a dramatically effective cooling medium, enabling previously hot debris, including metal, to be cleared away by hand almost immediately after a fire has been extinguished.

In addition to its frontline qualities, FireAde 2000 also addresses logistical and environmental concerns. Easy to store and transport it has unlimited shelf life, even after it has been mixed with water. It is also non-hazardous, non-toxic, non-corrosive and biodegradable. It is effective for use on fire categories A, B and D and European categories C, D and F.

For further information, please contact:
Fire Service Plus Limited
Tel: +44 (0) 151 643 8888
Website: www.fireserviceplus.com

PLYMOVENT EXHAUST REMOVAL SYSTEM IMPROVES THE LIFE OF THE FIRE FIGHTERS AT TIN SHU WAI FIRE STATION IN HONG KONG.

PlymoVent the world leader in Exhaust Removal Systems has in cooperation with its representative in Hong Kong, Anway Engineering, been awarded the order to improve the air quality in the Tin Shu Wai fire station.

It is a well-known fact that diesel exhaust in fire stations around the world, due to its hazardous content of dangerous chemicals and particles, can course severe health problems for the fire fighters when inhaled.

Authorities, fire chiefs and fire fighters organizations around the world give clear recommendations to install 100% source capture systems to remove the hazardous from the stations.

PlymoVent has more than two decades of experience in solving these problems around the world and has now been awarded its first installation in Hong Kong.

When the fire vehicles exit the station or return back after a call, the system is connected to the tail pipe by a special nozzle Grabber which give a 100% sealed connection and the diesel fumes are extracted away from the fire station thus protecting the health of the fire fighters plus reducing the cost of maintenance for cleaning or repainting the premises.

For more information, please contact:
PlymoVent
Tel: +46 40 30 31 30
E-mail: info@plymovent.se

FIRE DETECTION SYSTEM FROM SECURITON AG

Since 1948 SECURITON has been dedicated to the electronic detection of fire. SECURITON develops and manufactures a large range of different fire detection systems to fulfill broad customers' need from tunnels, commercial buildings, industries, telecommunications, utility stations or others.

Road and Subway Tunnel Fire Detection

Transafe ADW 511 Linear Heat Detector with copper sensor tube is an effective solution for tunnel and industry environment. It combines rate of rise and maximum heat detection technology for earliest fire detection. It's durable copper sensor tube offers minimal maintenance and maximum reliability. The decentralized design with every 100m per system offers best system redundancy when monitoring any size of area. The system holds the approval from VdS and is listed by UL.

Equipment Monitoring by ASD

ASD Smoke Aspiration Detector from SECURITON is an effective, yet flexible solution for customers who demand early fire detection. Whether in room monitoring or in object monitoring, the ASD Smoke Aspiration Detector from SECURITON one ASD unit can run up to 100m of pipe and up to 20 suction holes. High sensitive detectors enable earliest fire detection. The system holds the approval from VdS.

Unique features of ASD

1. Double detectors per system, ensure accurate detection result and best safety redundancy. This feature is useful especially when the ASD system is linked to automatic release extinguishing system.
2. A smoke level indicator indicates the smoke concentration and freely programmable outputs are available for triggering pre-alarm signals accordingly. These pre-alarm outputs, can be used to activate data backup process to prevent loss of valuable information on servers, or can activate other pre-alarm sequences.
3. Up to 6 remote detectors can be added to one smoke suction system.
4. Installation of up to 6 detectors inside pipe network enables individual recognition of zones or objects. The remote detectors can be mounted directly on the equipment to ensure the shortest smoke traveling distance, and give individual identification for each equipment.

For more information, please contact:
Securiton AG
Tel: +60 3 7725 1699
Website: www.securiton.ch

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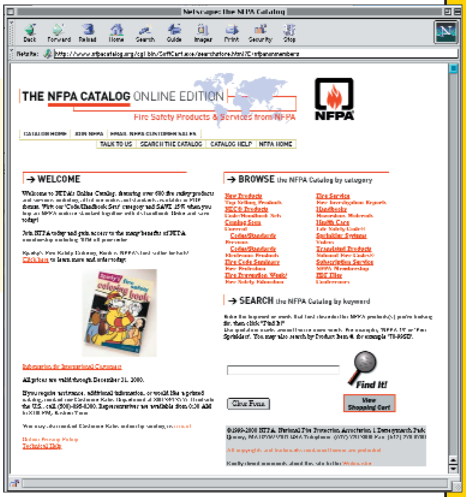
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